1998 Index for *Missouri Epidemiologist*

KEY

J/F98 = January/February 1998
M/A98 = March/April 1998
M/J98 = May/June 1998
J/A98 = July/August 1998
S/O98 = September/October 1998
N/D98 = November/December 1998

Missouri EPIDEMIOLOGIST

Volume 20, Number 1 *January-February 1998*

Tuberculosis Case Report in a Foreign-Born Child

Lynelle Phillips, R.N., M.P.H.
Bureau of Tuberculosis Control

Michael Cooperstock, M.D.
Department of Child Health
University Hospital and Clinics

Tuberculosis is rare in children nationwide. Missouri had seven reported cases in 1997. However, because of its resurgence in many parts of the world, pediatricians should expect to see more tuberculosis in foreign-born children. The following case study illustrates the challenges in diagnosing pediatric tuberculosis, and the rationale behind policies for screening and treating high-risk children.

Case Study

In December 1993, a 6-year-old girl presented to her pediatrician with decreased hearing acuity found by routine elementary-age screening. She had been adopted from a Korean orphanage at 9 months of age and had a history of poor growth there. She had scarlet fever and pneumonia prior to the age of 4, but no other recent significant illnesses since adoption. Adoption records did not indicate vaccination with BCG, and she had no vaccination scar. She had four documented tine tests during the adoption process in 1987 and 1988, all of which were negative. She had a tine test at a community hospital in 1991, results of which are unknown. In December 1993, her ear was irrigated to remove wax, and smears and culture of drainage fluid were negative. After a period of recurrent mild to moderate hearing loss, she was referred to an otolaryngologist, who performed bilateral myringotomy and placement of tympanostomy tubes on January 8, 1996. Mucopurulent fluid was noted in the middle ear. Because of persistent drainage, on February 6, 1996, cortisporin drops were begun. Tobradex drops were begun on February 20, 1996. By late February, drainage had subsided in the right ear after treatment with cortisporin and Tobradex drops and suctioning; drainage persisted in the left ear. Audiology testing showed hearing loss. On March 27, 1996, hearing loss with very viscid mucus or possibly scar bands was noted. Treatment with topical and oral antibiotics continued. Hearing loss and drainage continued, despite intermittent treatment with topical tobramycin, gentamicin and amoxicillin. An allergist diagnosed allergic rhinitis and atopic dermatitis, and an antihistamine was administered. Hearing loss persisted, and otorrhea continued in the right ear. On September 19, 1996, right tympanomastoidectomy and ossiculoplasty with tympanic membrane reconstruction and left ear exploration were performed. Postoperative diagnoses were right chronic otorrhea with mastoiditis, right hearing loss and incus erosion, and left hearing loss with middle-ear granulomas. All cultures were negative for bacteria, acid-fast bacilli and fungus. The pathology report mentioned granulation tissue. A left tympanomastoidectomy was performed and a ventilating tube was placed on December 12, 1996. Biopsy of left ear was reported as cholesteatoma. Further consultation on January 16, 1997, demonstrated no evidence of immune deficiency or autoimmune disease.

On April 16, 1997, earaches and hearing loss were reported. The middle ear tubes were completely crust covered, and were replaced on May 6, 1997. The middle ear fluid grew acid-fast bacilli. An intermediate strength Mantoux skin test gave a reading of 20mm induration. Chest radiograph demonstrated a three centimeter extrapleural paraspinous cold abscess in the left lung apex and calcified lesions of healed primary tuberculosis. Cervical spine x-ray demonstrated tuberculous spondylitis at C7 and T1 with spine compression and marked gibbus formation. Isoniazid, rifampin, pyrazinamide and ethambutol were initiated on May 18, 1997. The initial culture of ear drainage eventually grew *Mycobacterium tuberculosis*, sensitive to isoniazid, rifampin, pyrazinamide, ethambutol and streptomycin. Marked

(continued on page 2)

Inside this Issue...

(continued from page 1)

improvement in the appearance of the ears was found. A hearing aid greatly improved her ability to function in school. A pediatric orthopedist recommended surgical stabilization of the spinal deformities. DNA-fingerprinting of the *M. tuberculosis* isolate revealed an 18 band strain, unlike any other found in Missouri.

Discussion

Tuberculosis-endemic countries such as Korea have experienced a recent resurgence in tuberculosis. Children adopted from orphanages in Asia, Africa, Latin America, Eastern Europe, the Caribbean and Pacific Islands may be at particularly high risk. Child care workers in these countries often receive poor pay and lack good health care. These workers have been reported to be at high risk for tuberculosis, and may be the source of infection for children under their care. Because of the lack of an identified exposure in the United States, and the unusual strain type, it is likely the child described in this case study became infected with *M. tuberculosis* while in the orphanage, and developed symptomatic disease in her ears approximately five years after adoption. The Centers for Disease Control and Prevention (CDC) recommends that a Mantoux PPD $\geq$10mm be considered positive for tuberculosis infection in children from endemic countries. However, physicians should evaluate children adopted from orphanages in other countries as cautiously as if they were household contacts to tuberculosis. In these children, a PPD skin test $\geq$5mm should be considered positive. Because of the tendency for false negatives with tine tests, physicians should disregard tine test results and perform PPD Mantoux skin tests on all high risk children. See sidebar at the top of this page. However, Mantoux skin tests may also give false-negative results, especially in severely ill patients, and tuberculosis infection cannot be entirely ruled out on the basis of a negative Mantoux skin test result.

Although this case reportedly did not receive BCG vaccine, many children adopted or immigrating from tuberculosis endemic countries will have received this vaccine in infancy. BCG vaccine is one of the most frequently used vaccines in the world, even though its efficacy for preventing tuberculosis disease remains somewhat questionable. In various studies, efficacy ranges from 0 to 80 percent. BCG does not usually result in a PPD $\geq$10mm, and is **not** a contraindication for a PPD. Immunity appears to wane after about two years. CDC recommends that patients from endemic countries, including children, who have positive PPDs should always be considered for preventive treatment, regardless of prior BCG vaccination. The risk for tuberculosis in PPD-positive children can be virtually eliminated with isoniazid treatment for nine months.

This case also illustrates the elusive ways tuberculosis disease may present in children. This patient had none of the classic signs and symptoms of disease, such as anorexia, fever, night sweats, cough, fatigue or malaise. Smears and cultures were negative for over two years after onset of symptoms. Aside from recurrent ear infection and moderate hearing loss, she was a healthy and happy child, an excellent student, and was involved in several extracurricular activities. Routine assessments for signs and symptoms of tuberculosis in children with positive PPDs may be insufficient to spot the subtle evolution of tuberculosis disease. See sidebar to the left. Isoniazid is safe, well tolerated in children and has been proven effective in preventing tuberculosis. The Missouri Department of Health and CDC encourage

(continued on page 24)

Children at Increased Risk for Tuberculosis

- Children immigrating from, or with travel histories to, endemic countries: Asia, Africa, Latin America, Eastern Europe, Carribean, and Pacific Islands **(No. 1 risk factor for tuberculosis in children)**
- Contact with a contagious tuberculosis case
- Radiographic or clinical findings suggesting tuberculosis
- Children infected with HIV
- Incarcerated adolescents
- Children exposed to high risk settings (nursing homes, homeless shelters, migrant workers, institutionalized adults, drug abuse)

Guidelines for Tuberculosis Control in Foreign-Born Children

- Screen all foreign-born children from endemic countries with Mantoux skin test.
- Disregard previous tine test results.
- Consider a PPD result 10mm or greater to be positive.
- Disregard history of BCG vaccination.
- If possible, treat all PPD-positive children with preventive therapy after ruling out active disease (Isoniazid for 9 months).
- Report all cases of tuberculosis infection and disease to your county health department as soon as possible.

Tuberculosis Skin Testing for HIV-Infected Persons: New Recommendations

Reprinted with permission from the Hawaii Communicable Disease Report, September/October 1997.

The Centers for Disease Control and Prevention (CDC) has recently revised their recommendations regarding anergy skin-testing and preventive therapy for Human Immunodeficiency Virus (HIV)-infected persons.[1] According to these new recommendations, anergy testing is no longer recommended as a routine component of tuberculosis (TB) screening among HIV-infected persons in the United States.

This change from previous recommendations followed a February 1997 meeting at CDC, during which current information regarding anergy skin-testing, Purified Protein Derivative (PPD) skin-testing, and TB preventive therapy for HIV-infected persons was discussed. In formulating these new recommendations, CDC considered the results of this meeting, as well as a review of published studies.

The Test

Anergy skin-testing assesses the cell-mediated, delayed-type hypersensitivity (DTH) responses to skin test antigens. The antigens are administered by intradermal injections using the Mantoux method, and have conventionally been considered positive if an induration measuring 5mm or more occurs within 48–72 hours. Mumps and Candida are usually used as the "control" antigens, since practically all individuals have been exposed to these agents, and should mount an appropriate immune response. PPD is also included in the skin test panel. Impaired DTH response is directly related to a decreasing CD4+T-lymphocyte count, and is also a predictive factor for the progression of acquired immunodeficiency syndrome and mortality in HIV-infected persons.[2,3,4,5] Because of complications associated with active TB in HIV-infected persons, it is important that these persons be screened for latent TB infections, and receive preventive therapy with isoniazid (INH) if indicated.

Limited Usefulness of Test

Several factors limit the usefulness of routine anergy testing in HIV-infected patients. These factors include problems with

- standardization and reproducibility of anergy skin-testing methods,
- the variable risk for TB associated with a diagnosis of anergy, and
- the lack of documented benefit of anergy skin-testing as part of screening programs for *M. tuberculosis* infection among HIV-infected persons.

It is not possible to exactly assess the risk of TB in HIV-positive anergic individuals, but the risk appears to be low. In studies conducted in the United States in which preventive therapy was administered principally to PPD-positive persons,[6,7] no cases of TB were observed in anergic persons. In a multicentered study,[8] the effect of residence on risk for TB was much greater than that of anergy. "In the United States, the public health impact of finding and treating patients who have infectious TB to prevent further transmission, and of providing preventive therapy to PPD-positive, HIV-infected persons to prevent additional infectious TB cases, should be greater than the effect of preventive therapy for HIV-positive anergic persons."[1]

Preventive Therapy

Whether anergic or not, HIV-positive PPD-negative individuals should be considered as candidates for preventive therapy if they have been recent contacts of patients with infectious pulmonary TB. Also preventive therapy may be beneficial for

- children who are born to HIV-infected women,
- children who are close contacts of a person with infectious TB, and
- HIV-infected adults who reside or work in institutions and are continually and unavoidably exposed to patients who have infectious TB.

"In selected situations, anergy testing may assist in guiding individual decisions regarding individual therapy. However, results of currently available anergy-testing methods in United States populations have not been demonstrated to make a useful contribution to most decisions about INH preventive therapy."[1]

REFERENCES:

1. Centers for Disease Control and Prevention. Anergy skin testing and preventive therapy for HIV-infected persons: revised recommendations. MMWR 1997;46(No. RR–15):1–10
2. Birx DL, Brundage J, Larson K, et al. The prognostic utility of delayed-type hypersensitivity skin testing in the evaluation of HIV-infected patients. J. Acquir Immune Defic Syndr 1993;6:1248–57.
3. Gordin FM, Hartigan PM, Klimas NG, et al. Delayed-type hypersensitivity skin tests are an independent predictor of human immunodeficiency virus disease progression. J Infect Dis 1994;169:893–7.
4. Blatt SP, Hendrix CW, Butzin CA, et al. Delayed-type hypersensitivity skin testing predicts progression to AIDS in HIV-infected patients. Ann Intern Med 1993;119:177–84.
5. Dolan MJ, Clerici M, Blatt SP, et al. In vitro T cell function, delayed-type hypersensitivity skin testing, and CD4+T cell subset phenotyping independently predict survival time in patients infected with human

(continued on page 24)

Missouri Health Strategic Architectures and Information Cooperative (MOHSAIC)

Nancy Hoffman, R.N., M.S.N.
Center for Health Information Management and Epidemiology

The Missouri Department of Health (DOH) views an integrated information system as critical to preserving and expanding the Missouri public health system. Based on this belief and recognizing that information was crucial to public health, in 1992, DOH embarked on a project to create an integrated public health information system. This system includes: an integrated client record, a means to collect and assess the health status of Missourians, and a statewide information network which could link public and private health care providers electronically. A group of high level DOH managers and representatives from local public health agencies spent three months creating a strategic plan for information systems. This plan, the Missouri Health Strategic Architectures and Information Cooperative (MOHSAIC) identified all the functions performed by DOH and local health agencies and the data needed to perform these functions. It provides the blueprint for creating the integrated information system.

Much has been accomplished since the creation of MOHSAIC. Accomplishments include:

- Implementation of standards for the purchase of hardware, software and network equipment.
- Development of a wide area network (WAN) that links state and local public health agencies.
- Establishment of initial data standards.
- Connection of DOH employees to one electronic mail system that supports communication with local health agencies and others via the Internet.
- Creation of the DOH Web Home Page that currently provides access to some assessment data via the Internet. The types and amount of data available are being expanded.

The Missouri health care delivery system has undergone changes since the creation of the MOHSAIC plan. Medicaid eligibility and Medicaid managed care are expanding. This is increasing private provider access to more clients previously served by local public health agencies. However, none of these changes in the health care delivery system alleviates the need for a strong public health agency to work with local communities to assess the health status of the population, establish priorities during these turbulent times, develop new innovative interventions and policies, and evaluate the impact of service delivery on service recipients.

The Institute of Medicine report, *The Future of Public Health*,[1] identified three core functions of public health—assessment, assurance and policy development. The public health integrated information system must be structured to address these three functions. The MOHSAIC integrated transaction system enhances the assurance function by:

- Identifying clients that need services.
- Integrating service delivery schedules for families.
- Eliminating redundant data collection.
- Establishing standards for data collection.
- Coordinating care across providers.
- Simplifying provider training to one computer system.
- Automating previous manual functions.

Although the initial MOHSAIC application currently being used by over sixty local health agencies is often referred to as the Immunization System or the Immunization Central Registry, it is far more than that. The scheduling, inventory and immunization components are the initial three of ten components scheduled for development as part of the MOHSAIC transaction system. The remaining seven components are:

Women's Wellness
Surveillance
Laboratory
Regulated Client
Service (Care) Coordination
Environmental
Primary Care

These components are in varying stages of planning, analysis or development. As these components are completed, they will be made available to MOHSAIC users.

The generic client management (registration) portion of the system allows users to register all clients no matter their age or service needs. There is a core of required information such as the client's name, date of birth, race, sex, ethnicity, and Departmental Client Number (DCN). Additional optional demographic information related to the client's occupation, employment, insurance coverage and care provider can also be entered. As additional services are added to the MOHSAIC application, this area may be modified slightly but will continue to be used to register all clients.

MOHSAIC currently interfaces with the Department of Social Services (DSS) DCN files to look up or assign unique numbers for clients. Therefore, any Medicaid, AFDC or Food Stamp DSS client has the same number. The DOH WIC program also uses this numbering system. While the DSS number is used as the primary unique client identifier, system users are encouraged to enter social security numbers (SSNs) when available. This increases the number of matches when attempting to merge other electronic files with the registry. The

registry has the SSN on each newborn so this will be a key matching variable when we match managed care files with the central registry.

At present, users must enter and update Medicaid eligibility and managed care enrollment information. The DSS interface will be expanded in the near future to include the electronic recording and/or updating of Medicaid managed care eligibility and enrollment information.

Previously, two regional immunization systems were created. In the western part of the state, the Kansas City Immunization Information System (KCIIS) served the Kansas City metropolitan area, including Kansas City, Cass, Clay, Jackson and Platte counties. The other regional system was the St. Louis Integrated Immunization Information System (SLIIIS) that served the Eastern Health District, including St. Louis City, St. Louis, St. Charles, Franklin and Jefferson counties. In addition, 99 counties outside the two urban areas were provided the Missouri Immunization Tracking System (MITS) software to use as a stand alone application.

Using funds provided by the Missouri Legislature to create a central registry, DOH accelerated the implementation schedule for MOHSAIC in October 1996. The process of converting existing local public health agency data, merging it with the central registry and initiating the use of MOHSAIC was begun. When the process is completed the KCIIS, SLIIIS and MITS systems will no longer be used.

To create the initial client central registry, a file containing demographic information for all births from January 1, 1994 to the present was created. This file was sent to the Social Security Administration who updated it with the SSNs for these children. DOH staff then worked to identify or assign a unique number for each child. This file was used to create a client central registry record for each of the more than 240,000 Missouri births.

Participating health users are entering both historical and current immunization information for these clients and others seen in their agencies. As agencies implement MOHSAIC, any immunization data entered into a previous electronic system is converted and merged with the central registry data as part of the implementation process.

Access to the system is in real time, with client information being stored in the central database in Jefferson City. Once an immunization record has been updated through MOHSAIC, the information is immediately available to other MOHSAIC agencies. DOH is responsible for the central registry data backup and recovery procedures.

The MOHSAIC integrated information system includes the following functions:

- The central registry is interfaced with the vital records system to enter all new births occurring in Missouri. The Social Security Administration provides SSNs for newborns on a weekly basis which are merged into the central registry. If the birth record includes Hepatitis B vaccine information, this is transferred to the client's immunization history. The file is also interfaced with the adoption and death certificate files to assure proper handling of records for clients included in these files.
- The system supports the documentation in the client's record of immunizations given either by the agency entering the information or by other providers prior to initiating use of the MOHSAIC system. If the child has been seen by another agency or private provider using the MOHSAIC system, the current agency or private provider simply updates the already established record with any additional information.
- Immunization records are maintained from birth through adulthood. Schools will have Internet access to verify immunization status of their children.
- The system allows the documentation of immunizations given at subsequent visits. For agencies using the inventory feature, the system includes the vaccine type, manufacturer, lot number, method of administration, site administered, and name of person administering. In the process, the vaccine inventory is reduced by the amount administered and the monthly "Doses Administered Report" is updated.
- The inventory component of the system can identify each client that received a dose of a specific vaccine by manufacturer and lot number should a recall occur.
- A record for each client can be printed indicating the vaccine types, dose numbers and dates received. These records provide documentation to meet the requirements for day care or school entry.
- The system assesses each client's immunization status and identifies needed immunizations based on the established recommendations. A record can be printed indicating this status and the immunizations due or past due.
- An electronic file of clients that are due or past due for immunizations is created for each provider to assist in reminder/recall activities. This file can be used to create letters to the clients or as an input to an automated telephone dialing system which is available in the system.
- Data from the central registry is available to DOH to determine the immunization coverage rates based on aggregate data for each provider, community or statewide.
- The system has the ability to create files that can be linked with other public or private health information systems using Health Level Seven (HL7) Standards.

In order to realize the full potential for the Immunization Central Registry, it must include immunization information on all Missouri children, no matter who provides the immunizations. Missouri currently has several pieces of legislation

(continued on page 27)

Epidemiologist Joins Division of Maternal, Child and Family Health

Dr. Michael Kramer became the Division of Maternal, Child and Family Health's first epidemiologist on November 3, 1997. He comes to the division from the University of Missouri, where he had been Assistant Professor in the Department of Child Health.

A native of California, he received his MD from the University of California–San Francisco in 1981. After an internship at Mott Children's Hospital, University of Michigan, he completed his pediatric residency at the University of Washington in 1985, where he also received his MPH in epidemiology in 1989. From 1989–91, he served in the Centers for Disease Control and Prevention's (CDC) Epidemiologic Intelligence Service, and was stationed at the University of Iowa. In Iowa, he became interested in asthma among farm children. He stayed on in Iowa to complete a fellowship in pediatric pulmonology. He then spent two and a half years at University of Missouri-Columbia as an assistant professor of child health.

Dr. Kramer says that the difficulty of combining clinical medicine with epidemiologic research prompted him to seek an opportunity to return to epidemiology and public health.

"Clinical medicine is very seductive, and I thought I would be able to combine it with epidemiology," he says. "But epidemiology is my primary interest."

"When I began seeking a position in epidemiology, colleagues both in Washington state and at CDC steered me toward the Missouri Department of Health. I was not aware of just how strong a department it is. CDC is particularly impressed with the department's ability to gather data," Kramer says.

Dr. Kramer's areas of research interest include rural and urban differences in childhood respiratory diseases; environmental exposures and adverse reproductive outcomes; placenta previa; Down Syndrome mortality; and the utilization of health services by children with chronic diseases.

Office of Surveillance Established

The Division of Environmental Health and Communicable Disease Prevention is pleased to announce the formation of a new Office of Surveillance, and the appointment of Howard L. Pue, D.V.M., M.S. as its chief.

The Office of Surveillance was established to track and document the occurrence and distribution of communicable, zoonotic and environmentally induced diseases in Missouri through the development and improvement of the statewide surveillance system. The office:

- Maintains case registries for communicable diseases including tuberculosis, sexually transmitted diseases and HIV and for lead poisoning.
- Assists programs in identifying surveillance data needs, designing data collection processes/systems, developing datasets, analyzing and interpreting data.
- Performs ad hoc analyses upon request from programs or other customers to answer inquiries and help target disease intervention activities.
- Analyzes and disseminates surveillance data at regular intervals to track trends.
- Provides consultation to programs regarding application of surveillance data to program policy/practice development.
- Develops and coordinates ongoing quality assurance processes.

Dr. Pue joined the Department of Health in December upon retiring from the U.S. Air Force, where he was Commander of the 7th Aerospace Medicine Squadron at Dyess Air Force Base in Texas. He received a D.V.M. degree from Oklahoma State University, and a M.S. in Veterinary Preventive Medicine from Ohio State University. He had worked in various capacities in environmental health and preventive medicine in the Air Force since 1983.

The Office of Surveillance staff of 17 includes personnel dedicated to surveillance for HIV, sexually transmitted diseases, communicable diseases, lead poisoning, occupational fatalities and hazardous substance emergency events. Office staff are also developing a Geographic Information System (GIS), and working with the department's Office of Information Systems to develop and implement a new surveillance component of the Missouri Health Strategic Architecture and Information Cooperative (MOHSAIC).

1998 Guidelines for Treatment of Sexually Transmitted Diseases

Physicians and other health-care providers have a critical role in preventing and treating sexually transmitted diseases (STDs). The following recommendations for the treatment of STDs, which were developed by the Centers for Disease Control and Prevention (CDC) in consultation with a group of outside experts, are intended to assist with that effort.

The recommendations, which update those released by CDC in 1993, were reprinted from CDC's *Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports*, Vol. 47, No. RR-1, January 23, 1998. This issue of the *Missouri Epidemiologist* contains those sections of the guidelines which relate to diseases characterized by urethritis and cervicitis. Other portions of the treatment guidelines will be reprinted in subsequent issues. A full copy of the guidelines in pdf format can be found on the Missouri Department of Health (DOH) Home Page at **http://www.health.state.mo.us/cgi-bin/uncgi/ShowPDF?DocumentName=1998+STD+Treatment Guide&DocumentSource=STDGuide** and also on CDC's Division of STD Prevention Home Page at **http://www.cdc.gov/nchstp/dstd/dstdp.html**.

If you have questions regarding these guidelines, please contact DOH's Bureau of STD/HIV Prevention at (573) 751-6141.

Additional information for medical providers on STDs and STD training courses is available on the Internet at the following sites:

CDC's Division of STD Prevention:
http://www.cdc.gov/nchstp/dstd/dstdp.html

CDC's Division of AIDS, STD, and TB Laboratory Research:
http://www.cdc.gov/ncidod/dastlr/dastlr.html

National Network of STD/HIV Prevention Training Centers:
http://129.137.232.101/STDPTC.html

St. Louis STD/HIV Prevention Training Center:
http://www.umsl.edu/services/itc/std_ptc.html
Ph: (314) 747-0294 or 747-1522

Medline - National Library of Medicine:
http://igm.nlm.nih.gov/

Diseases Characterized by Urethritis and Cervicitis

Diseases Characterized by Urethritis and Cervicitis

MANAGEMENT OF MALE PATIENTS WHO HAVE URETHRITIS

Urethritis, or inflammation of the urethra, is caused by an infection characterized by the discharge of mucopurulent or purulent material and by burning during urination. Asymptomatic infections are common. The only bacterial pathogens of proven clinical importance in men who have urethritis are *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. Testing to determine the specific disease is recommended because both of these infections are reportable to state health departments, and a specific diagnosis may improve compliance and partner notification. If diagnostic tools (e.g., a Gram stain and microscope) are unavailable, patients should be treated for both infections. The extra expense of treating a person who has nongonococcal urethritis (NGU) for both infections also should encourage the health-care provider to make a specific diagnosis. New nucleic acid amplification tests enable detection of *N. gonorrhoeae* and *C. trachomatis* on first-void urine; in some settings, these tests are more sensitive than traditional culture techniques.

Etiology

NGU is diagnosed if Gram-negative intracellular organisms cannot be identified on Gram stains. *C. trachomatis* is the most frequent cause (i.e., in 23%–55% of cases); however, the prevalence differs by age group, with lower prevalence among older men. The proportion of NGU cases caused by chlamydia has been declining gradually. Complications of NGU among men infected with *C. trachomatis* include epididymitis and Reiter's syndrome. Documentation of chlamydia infection is important because partner referral for evaluation and treatment would be indicated.

The etiology of most cases of nonchlamydial NGU is unknown. *Ureaplasma urealyticum* and possibly *Mycoplasma genitalium* are implicated in as many as one third of cases. Specific diagnostic tests for these organisms are not indicated.

Trichomonas vaginalis and HSV sometimes cause NGU. Diagnostic and treatment procedures for these organisms are reserved for situations in which NGU is nonresponsive to therapy.

Confirmed Urethritis

Clinicians should document that urethritis is present. Urethritis can be documented by the presence of any of the following signs:

a. Mucopurulent or purulent discharge.

b. Gram stain of urethral secretions demonstrating ≥5 WBCs per oil immersion field. The Gram stain is the preferred rapid diagnostic test for evaluating urethritis. It is highly sensitive and specific for documenting both urethritis and the presence or absence of gonococcal infection. Gonococcal infection is established by documenting the presence of WBCs containing intracellular Gram-negative diplococci.

c. Positive leukocyte esterase test on first-void urine, or microscopic examination of first-void urine demonstrating ≥10 WBCs per high power field.

If none of these criteria is present, then treatment should be deferred, and the patient should be tested for *N. gonorrhoeae* and *C. trachomatis* and followed closely in the event of a positive test result. If the results demonstrate infection with either *N. gonorrhoeae* or *C. trachomatis*, the appropriate treatment should be given and sex partners referred for evaluation and treatment.

Empiric treatment of symptoms without documentation of urethritis is recommended only for patients at high risk for infection who are unlikely to return for a follow-up evaluation (e.g., adolescents who have multiple partners). Such patients should be treated for gonorrhea and chlamydia. Partners of patients treated empirically should be referred for evaluation and treatment.

MANAGEMENT OF PATIENTS WHO HAVE NONGONOCOCCAL URETHRITIS

Diagnosis

All patients who have urethritis should be evaluated for the presence of gonococcal and chlamydial infection. Testing for chlamydia is strongly recommended because of the increased utility and availability of highly sensitive and specific testing methods and because a specific diagnosis might improve compliance and partner notification.

Treatment

Treatment should be initiated as soon as possible after diagnosis. Single-dose regimens have the important advantage of improved compliance and of directly observed therapy. If multiple-dose regimens are used, the medication should be provided in the clinic or health-care provider's office. Treatment with the recommended regimen can result in alleviation of symptoms and microbiologic cure of infection.

Recommended Regimens

Azithromycin 1 g orally in a single dose,

OR

Doxycycline 100 mg orally twice a day for 7 days.

Alternative Regimens

Erythromycin base 500 mg orally four times a day for 7 days

OR

Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days,

OR

Ofloxacin 300 mg twice a day for 7 days.

If only erythromycin can be used and a patient cannot tolerate high-dose erythromycin schedules, one of the following regimens can be used:

Erythromycin base 250 mg orally four times a day for 14 days,

OR

Erythromycin ethylsuccinate 400 mg orally four times a day for 14 days.

Follow-Up for Patients Who Have Urethritis

Patients should be instructed to return for evaluation if symptoms persist or recur after completion of therapy. Symptoms alone, without documentation of signs or laboratory evidence of urethral inflammation, are not a sufficient basis for retreatment. Patients should be instructed to abstain from sexual intercourse until therapy is completed.

Partner Referral

Patients should refer for evaluation and treatment all sex partners within the preceding 60 days. A specific diagnosis may facilitate partner referral; therefore, testing for gonorrhea and chlamydia is encouraged.

Recurrent and Persistent Urethritis

Objective signs of urethritis should be present before initiation of antimicrobial therapy. Effective regimens have not been identified for treating patients who have persistent symptoms or frequent recurrences after treatment. Patients who have persistent or recurrent urethritis should be re-treated with the initial regimen if they did not comply with the treatment regimen or if they were reexposed to an untreated sex partner. Otherwise, a wet mount examination and culture of an intraurethral swab specimen for *T. vaginalis* should be performed. Urologic examinations usually do not reveal a specific etiology. If the patient was compliant with the initial regimen and reexposure can be excluded, the following regimen is recommended:

Recommended Treatment for Recurrent/Persistent Urethritis

Metronidazole 2 g orally in a single dose,

PLUS

Erythromycin base 500 mg orally four times a day for 7 days,

OR

Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days.

Special Considerations

HIV Infection

Gonococcal urethritis, chlamydial urethritis, and nongoncoccal, nonchlamydial urethritis may facilitate HIV transmission. Patients who have NGU and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

MANAGEMENT OF PATIENTS WHO HAVE MUCOPURULENT CERVICITIS

Mucopurulent cervicitis (MPC) is characterized by a purulent or mucopurulent endocervical exudate visible in the endocervical canal or in an endocervical swab specimen. Some experts also make the diagnosis on the basis of easily induced cervical bleeding. Although some experts consider an increased number of polymorphonuclear leukocytes on endocervical Gram stain as being useful in the diagnosis of MPC, this criterion has not been standardized, has a low positive-predictive value (PPV), and is not available in some settings. MPC often is asymptomatic, but some women have an abnormal vaginal discharge and vaginal bleeding (e.g., after sexual intercourse). MPC can be caused by *C. trachomatis* or *N. gonorrhoeae*; however, in most cases neither organism can be isolated. MPC can persist despite repeated courses of antimicrobial therapy. Because relapse or reinfection with *C. trachomatis* or *N. gonorrhoeae* usually does not apply to persistent cases of MPC, other nonmicrobiologic determinants (e.g., inflammation in an ectropion) could be involved.

Patients who have MPC should be tested for *C. trachomatis* and for *N. gonorrhoeae* by using the most sensitive and specific test for the population served. However, MPC is not a sensitive predictor of infection with these organisms, because most women who have *C. trachomatis* or *N. gonorrhoeae* do not have MPC.

Treatment

The results of sensitive tests for *C. trachomatis* or *N. gonorrhoeae* (e.g., culture or nucleic acid amplification tests) should determine the need for treatment, unless the likelihood of infection with either organism is high or the patient is unlikely to return for treatment. Empiric treatment should be considered for a patient who has a suspected case of gonorrhea and/or chlamydia if a) the prevalence of these diseases differs substantially (i.e., >15%) between clinics in the geographic area and b) the patient might be difficult to locate for treatment. After the possibilities of relapse and reinfection have been excluded, management of persistent MPC is unclear. For such cases, additional antimicrobial therapy may be of little benefit.

Follow-Up

Follow-up should be as recommended for the infections for which the woman is being treated. If symptoms persist, women should be instructed to return for reevaluation and to abstain from sexual intercourse even if they have completed the prescribed therapy.

Management of Sex Partners

Management of sex partners of women treated for MPC should be appropriate for the identified or suspected STD. Partners should be notified, examined, and treated for the STD identified or suspected in the index patient.

Patients should be instructed to abstain from sexual intercourse until they and their sex partners are cured. Because a microbiologic test of cure usually is not recommended, patients should abstain from sexual intercourse until therapy is completed (i.e., 7 days after a single-dose regimen or after completion of a 7-day regimen).

Special Considerations

HIV Infection

Patients who have MPC and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

CHLAMYDIAL INFECTION

In the United States, chlamydial genital infection occurs frequently among sexually active adolescents and young adults. Asymptomatic infection is common among both men and women. Screening sexually active adolescents for chlamydial infection should be routine during annual examinations, even if symptoms are not present. Screening women aged 20–24 years also is suggested, particularly for those who have new or multiple sex partners and who do not consistently use barrier contraceptives.

Chlamydial Infection in Adolescents and Adults

Several important sequelae can result from *C. trachomatis* infection in women; the most serious of these include PID, ectopic pregnancy, and infertility. Some women who have apparently uncomplicated cervical infection already have subclinical upper reproductive tract infection. A recent investigation of patients in a health maintenance organization demonstrated that screening and treatment of cervical infection can reduce the likelihood of PID.

Treatment

Treatment of infected patients prevents transmission to sex partners; and, for infected pregnant women, treatment might prevent transmission of *C. trachomatis* to infants during birth. Treatment of sex partners helps to prevent reinfection of the index patient and infection of other partners.

Coinfection with *C. trachomatis* often occurs among patients who have gonococcal infection; therefore, presumptive treatment of such patients for chlamydia is appropriate (see Gonococcal Infection, Dual Therapy for Gonococcal and Chlamydial Infections). The following recommended treatment regimens and the alternative regimens cure infection and usually relieve symptoms.

Recommended Regimens

Azithromycin 1 g orally in a single dose,

OR

Doxycycline 100 mg orally twice a day for 7 days.

Alternative Regimens

Erythromycin base 500 mg orally four times a day for 7 days,

OR

Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days,

OR

Ofloxacin 300 mg orally twice a day for 7 days.

The results of clinical trials indicate that azithromycin and doxycycline are equally efficacious. These investigations were conducted primarily in populations in which follow-up was encouraged and adherence to a 7-day regimen was good. Azithromycin should always be available to health-care providers to treat at least those patients for whom compliance is in question.

In populations with erratic health-care-seeking behavior, poor compliance with treatment, or minimal follow-up, azithromycin may be more cost-effective because it provides single-dose, directly observed therapy. Doxycycline costs less than azithromycin, and it has been used extensively for a longer period. Erythromycin is less efficacious than either azithromycin and doxycycline, and gastrointestinal side effects frequently discourage patients from complying with this regimen. Ofloxacin is similar in efficacy to doxycycline and azithromycin, but it is more expensive to use and offers no advantage with regard to the dosage regimen. Other quinolones either are not reliably effective against chlamydial infection or have not been adequately evaluated.

To maximize compliance with recommended therapies, medications for chlamydial infections should be dispensed on site, and the first dose should be directly observed. To minimize further transmission of infection, patients treated for chlamydia should be instructed to abstain from sexual intercourse for 7 days after single-dose therapy or until completion of a 7-day regimen. Patients also should be instructed to abstain from sexual intercourse until all of their sex partners are cured to minimize the risk for reinfection.

Follow-Up

Patients do not need to be retested for chlamydia after completing treatment with doxycycline or azithromycin unless symptoms persist or reinfection is suspected, because these therapies are highly efficacious. A test of cure may be considered 3 weeks after completion of treatment with erythromycin. The validity of chlamydial culture testing at <3 weeks after completion of therapy to identify patients who did not respond to therapy has not been established. False-negative results can occur because of small numbers of chlamydial organisms. In addition, nonculture tests conducted at <3 weeks after completion of therapy for patients who were treated successfully could be false-positive because of continued excretion of dead organisms.

Some studies have demonstrated high rates of infection among women retested several months after treatment, presumably because of reinfection. In some populations (e.g., adolescents), rescreening women several months after treatment might be effective for detecting further morbidity.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation, testing, and treatment. Because exposure intervals have received limited evaluation, the following recommendations are somewhat arbitrary. Sex partners should be evaluated, tested, and treated if they had sexual contact with the patient during the 60 days preceding onset of symptoms in the patient or diagnosis of chlamydia. Health-care providers should treat the most recent sex partner even if the time of the last sexual contact was >60 days before onset or diagnosis.

Patients should be instructed to abstain from sexual intercourse until they and their sex partners have completed treatment. Because a microbiologic test of cure usually is not recommended, abstinence should be continued until therapy is completed (i.e., 7 days after a single-dose regimen or after completion of a 7-day regimen). Timely treatment of sex partners is essential for decreasing the risk for reinfecting the index patient.

Special Considerations

Pregnancy

Doxycycline and ofloxacin are contraindicated for pregnant women. The safety and efficacy of azithromycin use in pregnant and lactating women have not been established. Repeat testing, preferably by culture, 3 weeks after completion of therapy with the following regimens is recommended, because a) none of these regimens are highly efficacious and b) the frequent side effects of erythromycin might discourage patient compliance with this regimen.

Recommended Regimens for Pregnant Women

Erythromycin base 500 mg orally four times a day for 7 days,

OR

Amoxicillin 500 mg orally three times a day for 7 days.

Alternative Regimens for Pregnant Women

Erythromycin base 250 mg orally four times a day for 14 days,

OR

Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days,

OR

Erythromycin ethylsuccinate 400 mg orally four times a day for 14 days,

OR

Azithromycin 1 g orally in a single dose.

Note: Erythromycin estolate is contraindicated during pregnancy because of drug-related hepatotoxicity. Preliminary data indicate that azithromycin may be safe and effective. However, data are insufficient to recommend the routine use of azithromycin in pregnant women.

HIV Infection
Patients who have chlamydial infection and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

Chlamydial Infection in Infants

Prenatal screening of pregnant women can prevent chlamydial infection among neonates. Pregnant women who are <25 years of age or who have new or multiple sex partners particularly should be targeted for screening. Periodic prevalence surveys of chlamydial infection can be conducted to confirm the validity of using these recommendations in specific clinical settings.

C. trachomatis infection of neonates results from perinatal exposure to the mother's infected cervix. The prevalence of *C. trachomatis* infection among pregnant women usually is >5%, regardless of race/ethnicity or socioeconomic status. Neonatal ocular prophylaxis with silver nitrate solution or antibiotic ointments does not prevent perinatal transmission of *C. trachomatis* from mother to infant. However, ocular prophylaxis with those agents does prevent gonoccocal ophthalmia and should be continued for that reason (see Prevention of Ophthalmia Neonatorum).

Initial *C. trachomatis* perinatal infection involves mucous membranes of the eye, oropharynx, urogenital tract, and rectum. *C. trachomatis* infection in neonates is most often recognized by conjunctivitis that develops 5–12 days after birth. Chlamydia is the most frequent identifiable infectious cause of ophthalmia neonatorum. *C. trachomatis* also is a common cause of subacute, afebrile pneumonia with onset from 1 to 3 months of age. Asymptomatic infections also can occur in the oropharynx, genital tract, and rectum of neonates.

Ophthalmia Neonatorum Caused by *C. trachomatis*

A chlamydial etiology should be considered for all infants aged ≤30 days who have conjunctivitis.

Diagnostic Considerations

Sensitive and specific methods used to diagnose chlamydial ophthalmia in the neonate include both tissue culture and nonculture tests (e.g., direct fluorescent antibody tests and immunoassays). Giemsa-stained smears are specific for *C. trachomatis*, but such tests are not sensitive. Specimens must contain conjunctival cells, not exudate alone. Specimens for culture isolation and nonculture tests should be obtained from the everted eyelid using a dacron-tipped swab or the swab specified by the manufacturer's test kit. A specific diagnosis of *C. trachomatis* infection confirms the need for treatment not only for the neonate, but also for the mother and her sex partner(s). Ocular exudate from infants being evaluated for chlamydial conjunctivitis also should be tested for *N. gonorrhoeae*.

Recommended Regimen
Erythromycin 50 mg/kg/day orally divided into four doses daily for 10–14 days.

Topical antibiotic therapy alone is inadequate for treatment of chlamydial infection and is unnecessary when systemic treatment is administered.

Follow-Up

The efficacy of erythromycin treatment is approximately 80%; a second course of therapy may be required. Follow-up of infants to determine resolution is recommended. The possibility of concomitant chlamydial pneumonia should be considered.

Management of Mothers and Their Sex Partners

The mothers of infants who have chlamydial infection and the sex partners of these women should be evaluated and treated (see Chlamydial Infection in Adolescents and Adults).

Infant Pneumonia Caused by *C. trachomatis*

Characteristic signs of chlamydial pneumonia in infants include a) a repetitive staccato cough with tachypnea and b) hyperinflation and bilateral diffuse infiltrates on a chest radiograph. Wheezing is rare, and infants are typically afebrile. Peripheral eosinophilia sometimes occurs in infants who have chlamydial pneumonia. Because clinical presentations differ, initial treatment and diagnostic tests should encompass *C. trachomatis* for all infants aged 1–3 months who possibly have pneumonia.

Diagnostic Considerations

Specimens for chlamydial testing should be collected from the nasopharynx. Tissue culture is the definitive standard for chlamydial pneumonia; nonculture tests can be used with the knowledge that nonculture tests of nasopharyngeal specimens produce lower sensitivity and specificity than nonculture tests of ocular specimens. Tracheal aspirates and lung biopsy specimens, if collected, should be tested for *C. trachomatis*.

The microimmunofluorescence test for *C. trachomatis* antibody is useful but not widely available. An acute IgM antibody titer ≥1:32 is strongly suggestive of *C. trachomatis* pneumonia.

Because of the delay in obtaining test results for chlamydia, the decision to include an agent in the antibiotic regimen that is active against *C. trachomatis* must frequently be based on the clinical and radiologic findings. The results of tests for chlamydial infection assist in the management of an infant's illness and determine the need for treating the mother and her sex partner(s).

Recommended Regimen

Erythromycin base 50 mg/kg/day orally divided into four doses daily for 10–14 days.

Follow-Up

The effectiveness of erythromycin treatment is approximately 80%; a second course of therapy may be required. Follow-up of infants is recommended to determine whether the pneumonia has resolved. Some infants with chlamydial pneumonia have had abnormal pulmonary function tests later in childhood.

Management of Mothers and Their Sex Partners

Mothers of infants who have chlamydial infection and the sex partners of these women should be evaluated and treated according to the recommended treatment of adults for chlamydial infections (see Chlamydial Infection in Adolescents and Adults).

Infants Born to Mothers Who Have Chlamydial Infection

Infants born to mothers who have untreated chlamydia are at high risk for infection; however, prophylatic antibiotic treatment is not indicated, and the efficacy of such treatment is unknown. Infants should be monitored to ensure appropriate treatment if infection develops.

Chlamydial Infection in Children

Sexual abuse must be considered a cause of chlamydial infection in preadolescent children, although perinatally transmitted *C. trachomatis* infection of the nasopharynx, urogenital tract, and rectum may persist for >1 year (see Sexual Assault or Abuse of Children). Because of the potential for a criminal investigation and legal proceedings for sexual abuse, a diagnosis of *C. trachomatis* in a preadolescent child requires the high specificity provided by isolation in cell culture. The cultures should be confirmed by microscopic identification of the characteristic intracytoplasmic inclusions, preferably by fluorescein-conjugated monoclonal antibodies specific for *C. trachomatis*.

Diagnostic Considerations

Nonculture tests for chlamydia should not be used because of the possibility of false-positive test results. With respiratory tract specimens, false-positive results can occur because of cross-reaction of test reagents with *Chlamydia pneumoniae*; with genital and anal specimens, false-positive results occur because of cross-reaction with fecal flora.

Recommended Regimens

Children who weigh <45 kg:

Erythromycin base 50 mg/kg/day orally divided into four doses daily for 10–14 days.

NOTE: The effectiveness of treatment with erythromycin is approximately 80%; a second course of therapy may be required.

Children who weigh ≥45 kg but are <8 years of age:

Azithromycin 1 g orally in a single dose.

Children ≥8 years of age:

Azithromycin 1 g orally in a single dose,

OR

Doxycycline 100 mg orally twice a day for 7 days.

Other Management Considerations

See Sexual Assault or Abuse of Children.

Follow-Up

Follow-up cultures are necessary to ensure that treatment has been effective.

GONOCOCCAL INFECTION

Gonococcal Infection in Adolescents and Adults

In the United States, an estimated 600,000 new infections with *N. gonorrhoeae* occur each year. Most infections among men produce symptoms that cause them to seek curative treatment soon enough to prevent serious sequelae—but this may not be soon enough to prevent transmission to others. Many infections among women do not produce recognizable symptoms until complications (e.g., pelvic inflammatory disease [PID]) have occurred. Both symptomatic and asymptomatic cases of PID can result in tubal scarring that leads to infertility or ectopic pregnancy. Because gonococcal infections among women often are asymptomatic, an important component of gonorrhea control in the United States continues to be the screening of women at high risk for STDs.

Dual Therapy for Gonococcal and Chlamydial Infections

Patients infected with *N. gonorrhoeae* often are coinfected with *C. trachomatis*; this finding led to the recommendation that patients treated for gonococcal infection also be treated routinely with a regimen effective against uncomplicated genital *C. trachomatis* infection. Routine dual therapy without testing for chlamydia can be cost-effective for populations in which chlamydial infection accompanies 20%–40% of gonococcal infections, because the cost of therapy for chlamydia (e.g., $0.50–$1.50 for doxycycline) is less than the cost of testing. Some experts believe that the routine use of dual therapy has resulted in substantial decreases in the prevalence of chlamydial infection. Because most gonococci in the United States are susceptible to doxycycline and azithromycin, routine cotreatment might hinder the development of antimicrobial-resistant *N. gonorrhoeae*.

Since the introduction of dual therapy, the prevalence of chlamydial infection has decreased in some populations, and simultaneous testing for chlamydial infection has become quicker, more sensitive, and more widely available. In geographic areas in which the rates of coinfection are low, some clinicians might prefer to test for chlamydia rather than treat presumptively. However, presumptive treatment is indicated for patients who may not return for test results.

Quinolone-Resistant N. gonorrhoeae (QRNG)

Cases of gonorrhea caused by *N. gonorrhoeae* resistant to fluoroquinolones have been reported sporadically from many parts of the world, including North America, and are becoming widespread in parts of Asia. As of February 1997, however, QRNG occurred rarely in the United States: <0.05% of 4,639 isolates collected by CDC's Gonococcal Isolate Surveillance Project (GISP) during 1996 had minimum inhibitory concentrations (MICs) ≥1.0 mg/mL to ciprofloxacin. The GISP sample is collected from 26 cities and includes approximately 1.3% of all reported gonococcal infections among

men in the United States. As long as QRNG strains comprise <1% of all *N. gonorrhoeae* strains isolated at each of the 26 cities, the fluoroquinolone regimens can be used with confidence. However, importation of QRNG will probably continue, and the prevalence of QRNG in the United States could increase to the point that fluoroquinolones no longer reliably eradicate gonococcal infections.

Uncomplicated Gonococcal Infections of the Cervix, Urethra, and Rectum

Recommended Regimens

Cefixime 400 mg orally in a single dose,

OR

Ceftriaxone 125 mg IM in a single dose,

OR

Ciprofloxacin 500 mg orally in a single dose,

OR

Ofloxacin 400 mg orally in a single dose,

PLUS

Azithromycin 1 g orally in a single dose,

OR

Doxycycline 100 mg orally twice a day for 7 days.

Cefixime has an antimicrobial spectrum similar to that of ceftriaxone, but the 400-mg oral dose does not provide as high nor as sustained a bactericidal level as that provided by the 125-mg dose of ceftriaxone. In published clinical trials, the 400-mg dose cured 97.1% of uncomplicated urogenital and anorectal gonococcal infections. The advantage of cefixime is that it can be administered orally.

Ceftriaxone in a single injection of 125 mg provides sustained, high bactericidal levels in the blood. Extensive clinical experience indicates that ceftriaxone is safe and effective for the treatment of uncomplicated gonorrhea at all sites, curing 99.1% of uncomplicated urogenital and anorectal infections in published clinical trials.

Ciprofloxacin is effective against most strains of *N. gonorrhoeae*. At a dose of 500 mg, ciprofloxacin provides sustained bactericidal levels in the blood; in published clinical trials, it has cured 99.8% of uncomplicated urogenital and anorectal infections. Ciprofloxacin is safe, relatively inexpensive, and can be administered orally.

Ofloxacin also is effective against most strains of *N. gonorrhoeae*, and it has favorable pharmacokinetics. The 400-mg oral dose has been effective for treatment of uncomplicated urogenital and anorectal infections, curing 98.4% of infections in published clinical trials.

Alternative Regimens

Spectinomycin 2 g IM in a single dose. Spectinomycin is expensive and must be injected; however, it has been effective in published clinical trials, curing 98.2% of uncomplicated urogenital and anorectal gonococcal infections. Spectinomycin is useful for treatment of patients who cannot tolerate cephalosporins and quinolones.

Single-dose cephalosporin regimens other than ceftriaxone 125 mg IM and cefixime 400 mg orally that are safe and highly effective against uncomplicated urogenital and anorectal gonococcal infections include a) ceftizoxime 500 mg IM, b) cefotaxime 500 mg IM, c) cefotetan 1 g IM, and d) cefoxitin 2 g IM with probenecid 1 g orally. None of these injectable cephalosporins offers any advantage in comparison with ceftriaxone, and clinical experience with these regimens for treatment of uncomplicated gonorrhea is limited.

Single-dose quinolone regimens include enoxacin 400 mg orally, lomefloxacin 400 mg orally, and norfloxacin 800 mg orally. These regimens appear to be safe and effective for the treatment of uncomplicated gonorrhea, but data regarding their use are limited. None of the regimens appears to offer any advantage over ciprofloxacin at a dose of 500 mg or ofloxacin at 400 mg.

Many other antimicrobials are active against *N. gonorrhoeae*; however, these guidelines are not intended to be a comprehensive list of all effective treatment regimens. Azithromycin 2 g orally is effective against uncomplicated gonococcal infection, but it is expensive and causes gastrointestinal distress too often to be recommended for treatment of gonorrhea. At an oral dose of 1 g, azithromycin is insufficiently effective, curing only 93% of patients in published studies.

Uncomplicated Gonococcal Infection of the Pharynx

Gonococcal infections of the pharynx are more difficult to eradicate than infections at urogenital and anorectal sites. Few antigonococcal regimens can reliably cure such infections >90% of the time.

Although chlamydial coinfection of the pharynx is unusual, coinfection at genital sites sometimes occurs. Therefore, treatment for both gonorrhea and chlamydia is suggested.

Recommended Regimens

Ceftriaxone 125 mg IM in a single dose,

OR

Ciprofloxacin 500 mg orally in a single dose,

OR

Ofloxacin 400 mg orally in a single dose,

PLUS

Azithromycin 1 g orally in a single dose,

OR

Doxycycline 100 mg orally twice a day for 7 days.

Follow-Up

Patients who have uncomplicated gonorrhea and who are treated with any of the recommended regimens need not return for a test of cure. Patients who have symptoms that persist after treatment should be evaluated by culture for *N. gonorrhoeae*, and any gonococci isolated should be tested for antimicrobial susceptibility. Infections identified after treatment with one of the recommended regimens usually result from reinfection rather than treatment failure, indicating a need for improved patient education and referral of sex partners. Persistent urethritis, cervicitis, or proctitis also may be caused by *C. trachomatis* and other organisms.

Management of Sex Partners

Patients should be instructed to refer sex partners for evaluation and treatment. All sex partners of patients who have *N. gonorrhoeae* infection should be evaluated and treated for *N. gonorrhoeae* and *C. trachomatis* infections if their last sexual contact with the patient was within 60 days before onset of symptoms or diagnosis of infection in the patient. If a patient's last sexual intercourse was >60 days before onset of symptoms or diagnosis, the patient's most recent sex partner should be treated. Patients should be instructed to avoid sexual intercourse until therapy is completed and they and their sex partners no longer have symptoms.

Special Considerations

Allergy, Intolerance, or Adverse Reactions

Persons who cannot tolerate cephalosporins or quinolones should be treated with spectinomycin. Because spectinomycin is unreliable (i.e., only 52% effective) against pharyngeal infections, patients who have suspected or known pharyngeal infection should have a pharyngeal culture evaluated 3–5 days after treatment to verify eradication of infection.

Pregnancy

Pregnant women should not be treated with quinolones or tetracyclines. Those infected with *N. gonorrhoeae* should be treated with a recommended or alternate cephalosporin. Women who cannot tolerate a cephalosporin should be administered a single 2-g dose of spectinomycin IM. Either erythromycin or amoxicillin is recommended for treatment of presumptive or diagnosed *C. trachomatis* infection during pregnancy (see Chlamydial Infection).

HIV Infection

Patients who have gonococcal infection and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

Gonococcal Conjunctivitis

Only one study of the treatment of gonococcal conjunctivitis among adults in North America has been published recently. In that study, 12 of 12 patients responded favorably to a single 1-g IM injection of ceftriaxone. The following recommendations reflect the opinions of expert consultants.

Treatment

Recommended Regimen

Ceftriaxone 1 g IM in a single dose, and lavage the infected eye with saline solution once.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infection, Management of Sex Partners).

Disseminated Gonococcal Infection (DGI)

DGI results from gonococcal bacteremia. DGI often results in petechial or pustular acral skin lesions, asymmetrical arthralgia, tenosynovitis, or septic arthritis. The infection is complicated occasionally by perihepatitis, and rarely by endocarditis or meningitis. Strains of *N. gonorrhoeae* that cause DGI tend to cause minimal genital inflammation. In the United States, these strains have occurred infrequently during the past decade.

No studies of the treatment of DGI among persons in North America have been published recently. The following recommendations reflect the opinions of experts. No treatment failures have been reported.

Treatment

Hospitalization is recommended for initial therapy, especially for patients who cannot be relied on to comply with treatment, for those in whom the diagnosis is uncertain, and for those who have purulent synovial effusions or other complications. Patients should be examined for clinical evidence of endocarditis and meningitis. Patients treated for DGI should be treated presumptively for concurrent *C. trachomatis* infection unless appropriate testing excludes this infection.

Recommended Initial Regimen

Ceftriaxone 1 g IM or IV every 24 hours.

Alternative Initial Regimens

Cefotaxime 1 g IV every 8 hours,

OR

Ceftizoxime 1 g IV every 8 hours,

OR

For persons allergic to ß-lactam drugs:

Ciprofloxacin 500 mg IV every 12 hours,

OR

Ofloxacin 400 mg IV every 12 hours,

OR

Spectinomycin 2 g IM every 12 hours.

All regimens should be continued for 24–48 hours after improvement begins, at which time therapy may be switched to one of the following regimens to complete a full week of antimicrobial therapy:

Cefixime 400 mg orally twice a day,

OR

Ciprofloxacin 500 mg orally twice a day,

OR

Ofloxacin 400 mg orally twice a day.

Management of Sex Partners

Gonococcal infection often is asymptomatic in sex partners of patients who have DGI. As with uncomplicated gonococcal infections, patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infection, Management of Sex Partners).

Gonococcal Meningitis and Endocarditis

Recommended Initial Regimen
Ceftriaxone 1–2 g IV every 12 hours.

Therapy for meningitis should be continued for 10–14 days; therapy for endocarditis should be continued for at least 4 weeks. Treatment of complicated DGI should be undertaken in consultation with an expert.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infection, Management of Sex Partners).

Gonococcal Infection in Infants

Gonococcal infection usually results from exposure to infected cervical exudate at birth. It is usually an acute illness that becomes manifest 2–5 days after birth. The prevalence of infection among infants depends on the prevalence of infection among pregnant women, on whether pregnant women are screened for gonorrhea, and on whether newborns receive ophthalmia prophylaxis.

The most serious manifestations of *N. gonorrhoeae* infection in newborns are ophthalmia neonatorum and sepsis, including arthritis and meningitis. Less serious manifestations include rhinitis, vaginitis, urethritis, and inflammation at sites of fetal monitoring.

Ophthalmia Neonatorum Caused by N. gonorrhoeae

Although *N. gonorrhoeae* is a less frequent cause of ophthalmia neonatorum in the United States than *C. trachomatis* and nonsexually transmitted agents, it is especially important because it may result in perforation of the globe of the eye and in blindness.

Diagnostic Considerations

Infants at increased risk for gonococcal ophthalmia are those who do not receive ophthalmia prophylaxis and those whose mothers have had no prenatal care or whose mothers have a history of STDs or substance abuse. Gonococcal ophthalmia is strongly suggested when typical Gram-negative diplococci are identified in conjunctival exudate, justifying presumptive treatment for gonorrhea after appropriate cultures for *N. gonorrhoeae* are obtained. Appropriate chlamydial testing should be done simultaneously. Presumptive treatment for *N. gonorrhoeae* may be indicated for newborns who are at increased risk for gonococcal ophthalmia and who have conjunctivitis but do not have gonococci in a Gram-stained smear of conjunctival exudate.

In all cases of neonatal conjunctivitis, conjunctival exudate should be cultured for *N. gonorrhoeae* and tested for antibiotic susceptibility before a definitive diagnosis is made. A definitive diagnosis is important because of the public health and social consequences of a diagnosis of gonorrhea. Nongonococcal causes of neonatal ophthalmia include *Moraxella catarrhalis* and other *Neisseria* species that are indistinguishable from *N. gonorrhoeae* on Gram-stained smear but can be differentiated in the microbiology laboratory.

Recommended Regimen
Ceftriaxone 25–50 mg/kg IV or IM in a single dose, not to exceed 125 mg.

NOTE: Topical antibiotic therapy alone is inadequate and is unnecessary if systemic treatment is administered.

Other Management Considerations
Simultaneous infection with *C. trachomatis* should be considered when a patient does not respond satisfactorily to treatment. Both mother and infant should be tested for chlamydial infection at the same time that gonorrhea testing is done (see Ophthalmia Neonatorum Caused by *C. trachomatis*). Ceftriaxone should be administered cautiously to hyperbilirubinemic infants, especially those born prematurely.

Follow-Up
Infants who have gonococcal ophthalmia should be hospitalized and evaluated for signs of disseminated infection (e.g., sepsis, arthritis, and meningitis). One dose of ceftriaxone is adequate therapy for gonococcal conjunctivitis, but many pediatricians prefer to continue antibiotics until cultures are negative at 48–72 hours. The duration of therapy should be decided in consultation with experienced physicians.

Management of Mothers and Their Sex Partners
The mothers of infants who have gonococcal infection and the mothers' sex partners should be evaluated and treated according to the recommendations for treating gonococcal infections in adults (see Gonococcal Infection in Adolescents and Adults).

Disseminated Gonococcal Infection and Gonococcal Scalp Abscess in Newborns

Sepsis, arthritis, meningitis, or any combination of these are rare complications of neonatal gonococcal infection. Localized gonococcal infection of the scalp might result from fetal monitoring through scalp electrodes. Detection of gonococcal infection in neonates who have sepsis, arthritis, meningitis, or scalp abscesses requires cultures of blood, CSF, and joint aspirate on chocolate agar. Specimens obtained from the conjunctiva, vagina, oropharynx, and rectum that are cultured on gonococcal selective medium are useful for identifying the primary site(s) of infection, especially if inflammation is present. Positive Gram-stained smears of exudate, CSF, or joint aspirate provide a presumptive basis for initiating treatment for *N. gonorrhoeae*. Diagnoses based on Gram-stained smears or presumptive identification of cultures should be confirmed with definitive tests on culture isolates.

Recommended Regimens
Ceftriaxone 25–50 mg/kg/day IV or IM in a single daily dose for 7 days,
with a duration of 10–14 days if meningitis is documented;
OR
Cefotaxime 25 mg/kg IV or IM every 12 hours for 7 days,
with a duration of 10–14 days if meningitis is documented.

Prophylactic Treatment for Infants Whose Mothers Have Gonococcal Infection

Infants born to mothers who have untreated gonorrhea are at high risk for infection.

Recommended Regimen in the Absence of Signs of Gonococcal Infection
Ceftriaxone 25–50 mg/kg IV or IM, not to exceed 125 mg, in a single dose.

Other Management Considerations

Mother and infant should be tested for chlamydial infection.

Follow-Up

A follow-up examination is not required.

Management of Mothers and Their Sex Partners

The mothers of infants who have gonococcal infection and the mothers' sex partners should be evaluated and treated according to the recommendations for treatment of gonococcal infections in adults (see Gonococcal Infection).

Gonococcal Infection in Children

After the neonatal period, sexual abuse is the most frequent cause of gonococcal infection in preadolescent children (see Sexual Assault or Abuse of Children). Vaginitis is the most common manifestation of gonococcal infection in preadolescent children. PID following vaginal infection is probably less common than among adults. Among sexually abused children, anorectal and pharyngeal infections with *N. gonorrhoeae* are common and frequently asymptomatic.

Diagnostic Considerations

Because of the legal implications of a diagnosis of *N. gonorrhoeae* infection in a child, only standard culture procedures for the isolation of *N. gonorrhoeae* should be used for children. Nonculture gonococcal tests for gonococci (e.g., Gram-stained smear, DNA probes, and EIA tests) should not be used alone; none of these tests have been approved by FDA for use with specimens obtained from the oropharynx, rectum, or genital tract of children. Specimens from the vagina, urethra, pharynx, or rectum should be streaked onto selective media for isolation of *N. gonorrhoeae,* and all presumptive isolates of *N. gonorrhoeae* should be identified definitively by at least two tests that involve different principles (e.g., biochemical, enzyme substrate, or serologic). Isolates should be preserved to enable additional or repeated testing.

Recommended Regimens for Children Who Weigh ≥45 kg

Children who weigh ≥45 kg should be treated with one of the regimens recommended for adults (see Gonococcal Infection).

NOTE: Quinolones are not approved for use in children because of concerns about toxicity based on animal studies. However, investigations of ciprofloxacin treatment in children who have cystic fibrosis demonstrated no adverse effects.

Recommended Regimen for Children Who Weigh <45 kg and Who Have Uncomplicated Gonococcal Vulvovaginitis, Cervicitis, Urethritis, Pharyngitis, or Proctitis

Ceftriaxone 125 mg IM in a single dose.

Alternative Regimen

Spectinomycin 40 mg/kg (maximum dose: 2 g) IM in a single dose may be used, but this therapy is unreliable for treatment of pharyngeal infections. Some experts use cefixime to treat gonococcal infections in children because it can be administered orally; however, no reports have been published concerning the safety or effectiveness of cefixime used for this purpose.

Recommended Regimen for Children Who Weigh <45 kg and Who Have Bacteremia or Arthritis

Ceftriaxone 50 mg/kg (maximum dose: 1 g) IM or IV in a single dose daily for 7 days.

Recommended Regimen for Children Who Weigh ≥45 kg and Who Have Bacteremia or Arthritis

Ceftriaxone 50 mg/kg (maximum dose: 2 g) IM or IV in a single dose daily for 10–14 days.

Follow-Up

Follow-up cultures are unnecessary if ceftriaxone is used. If spectinomycin is used to treat pharyngitis, a follow-up culture is necessary to ensure that treatment was effective.

Other Management Considerations

Only parenteral cephalosporins are recommended for use in children. Ceftriaxone is approved for all gonococcal infections in children; cefotaxime is approved for gonococcal ophthalmia only. Oral cephalosporins used for treatment of gonococcal infections in children have not been evaluated adequately.

All children who have gonococcal infections should be evaluated for coinfection with syphilis and *C. trachomatis*. For a discussion of concerns regarding sexual assault, refer to Sexual Assault or Abuse of Children.

Ophthalmia Neonatorum Prophylaxis

Instillation of a prophylactic agent into the eyes of all newborn infants is recommended to prevent gonococcal ophthalmia neonatorum; this procedure is required by law in most states [including Missouri]. All the recommended prophylactic regimens in this section prevent gonococcal ophthalmia. However, the efficacy of these preparations in preventing chlamydial ophthalmia is less clear, and they do not eliminate nasopharyngeal colonization by *C. trachomatis*. The diagnosis and treatment of gonococcal and chlamydial infections in pregnant women is the best method for preventing neonatal gonococcal and chlamydial disease. Not all women, however, receive prenatal care; and ocular prophylaxis is warranted because it can prevent sight-threatening gonococcal ophthalmia and it is safe, easy to administer, and inexpensive.

Prophylaxis

Recommended Regimens

Silver nitrate (1%) aqueous solution in a single application,

OR

Erythromycin (0.5%) ophthalmic ointment in a single application,

OR

Tetracycline ophthalmic ointment (1%) in a single application.

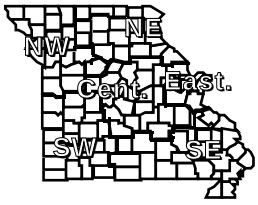
One of these recommended preparations should be instilled into both eyes of every neonate as soon as possible after delivery. If prophylaxis is delayed (i.e., not administered in the delivery room), a monitoring system should be established to ensure that all infants receive prophylaxis. All infants should be administered ocular prophylaxis, regardless of whether delivery is vaginal or cesarian. Single-use tubes or ampules are preferable to multiple-use tubes. Bacitracin is not effective. Povidone iodine has not been studied adequately.

Medical providers play a vital role in the prevention and control of sexually transmitted diseases (STDs). Providers can help significantly reduce the occurrence of these diseases by:

- **Evaluating each patient, as appropriate, for evidence of STDs, and for evidence of high-risk sexual behaviors.**
- **Promptly diagnosing and treating patients with STDs according to current guidelines.**
- **Providing appropriate follow-up after patients have been treated.**
- **Providing education and counseling to patients engaging in high-risk sexual behaviors.**
- **Promptly reporting, as required by Missouri law, all cases of chlamydial infection, gonorrhea, syphilis, and hepatitis B to the local health department, or to the Missouri Department of Health (DOH) at (573) 751-6463. Reports of cases of HIV infection/AIDS should be made as follows:**
  - **-Health care providers in St. Louis City and St. Louis County should report the individual to the St. Louis City Department of Health and Hospitals at (314) 658-1159.**
  - **-Providers in the five-county Kansas City metropolitan area should report to the Kansas City Health Department at (816) 983-4200.**
  - **-All other providers should report to DOH's Office of Surveillance at (573) 751-6463.**

It should be emphasized that the reporting of diagnosed cases of STDs to public health officials has important benefits. Such reporting provides specially trained public health professionals the opportunity to offer any needed assistance with partner elicitation and notification. By notifying an infected patient's sexual partners, additional infected persons can be identified and receive appropriate treatment and counseling. This will result in decreased morbidity and prevention of further transmission of infection. It is important to remember that with diseases such as gonorrhea, syphilis, and chlamydia, treatment of all sexual partners is essential to preventing reinfection of the index patient.

The reporting of STDs also allows public health officials to maintain an accurate understanding of current patterns and future trends for these diseases. Such an understanding is necessary in order to evaluate and plan prevention programs, and to obtain necessary resources to help prevent and treat these diseases. In addition, information on the occurrence of STDs in a given area can be of assistance to local medical providers with regard to certain diagnostic and treatment decisions they must make with their patients.



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention
QUARTERLY REPORT

Reporting Period *
July - September, 1997

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	3 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					FOR 1997	FOR 1996	FOR 1997	FOR 1996	5 YR MEDIAN
Vaccine Preventable Dis.																
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	0	0	0	0	0	0	7
Hib Other Invasive	0	0	0	0	0	0		0	0	0	1	1	2	4	7	26
Influenza	0	0	0	0	0	0		0	0	0	0	0	2	227	157	163
Measles	0	0	0	0	0	0		0	0	0	0	0	1	0	3	1
Mumps	0	0	0	0	0	0		0	0	0	0	0	4	0	6	26
Pertussis	2	0	5	2	3	3		4	2	0	0	21	20	50	35	42
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	0	1
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	0	1	0
Viral Hepatitis																
A	71	15	17	11	78	18		8	8	4	76	306	391	858	902	902
B	3	0	3	2	11	6		3	6	3	7	44	68	240	220	368
Non A - Non B	0	0	0	0	0	0		0	0	0	0	0	7	1	19	19
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	1	0	1
Meningitis																
Meningococcal	1	1	2	0	0	1		0	2	0	2	9	10	57	45	36
Enteric Infections																
Campylobacter	7	11	22	19	20	22		11	10	34	23	179	201	434	444	480
Salmonella	16	1	11	27	18	5		5	3	13	9	108	183	421	414	414
Shigella	7	3	4	20	3	0		2	3	9	1	52	87	176	312	507
Typhoid Fever	0	0	0	0	0	0		0	0	1	0	1	1	1	2	2
Parasitic Infections																
Giardiasis	21	7	40	25	27	25		11	38	35	9	238	239	520	543	512
Sexually Transmitted Dis.																
AIDS	12	0	7	11	4	5	15	32	37	21	3	147	216	349	598	216
Gonorrhea	43	13	93	112	55	23		287	817	373		1816	2117	5539	6310	12555
Prim. & Sec. syphilis	1	0	1	9	0	1		0	20	8		40	40	91	183	987
Tuberculosis																
Extrapulmonary	2	0	2	3	0	1	0	3	2	1	0	14	14	34	26	14
Pulmonary	4	1	3	7	8	1	0	12	10	8	0	54	47	134	124	54
Zoonotic																
Psittacosis	0	0	2	0	0	0		0	0	0	0	2	0	2	1	1
Rabies (Animal)	1	0	3	3	0	0		0	0	0	0	7	9	19	23	23
Rocky Mtn. Sp. Fever	0	0	2	1	4	0		0	0	0	0	7	5	16	13	14
Tularemia	0	1	1	2	2	0		0	0	0	0	6	6	11	9	19

TEAR OUT FOR FUTURE REFERENCE

Low Frequency Diseases

Anthrax
Botulism
Brucellosis - 1
Chancroid
Cholera
Cryptosporidiosis - 17
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 2
Legionellosis - 5
Leptospirosis
Lymphogranuloma Venereum
Malaria - 4
Plague
Rabies (human)
Reye Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 2
Trichinosis

Outbreaks

Foodborne
Waterborne - 1
Nosocomial
Pediculosis - 2
Scabies - 2
Other
- Hand/Foot/Mouth - 2
- ARI - 1
- Chickenpox - 1
- Rash - 1
- Shigella - 1

*Reporting Period Beginning June 29, Ending September 27, 1997.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.

Tuberculosis Case Report

(continued from page 2)
physicians caring for children to screen all high risk children, report positive skin tests to their county health department and initiate preventive therapy as indicated.

For more information about the prevention of tuberculosis in children, call the Missouri Department of Health's Bureau of Tuberculosis Control at (800) 611-2912.

REFERENCES

1. American Thoracic Society. Treatment of tuberculosis and tuberculosis infection in adults and children. Am J Respir Crit Care Med 1994;149: 1359-74.
2. International adoptions pose extra TB problems. TB Monitor 1997; August:91-93.

Tuberculosis Skin Testing

(continued from page 3)

immunodeficiency virus. J Infect Dis 1995;172:79–87.

6. Daley CL, Hahn JA, Hopewell PC, Moss AR, Schecter GF. Incidence of tuberculosis in injection drug users in San Francisco, 1990-1994 [abstract no. 11]. Lancet Conference on the Challenge of Tuberculosis, Washington D.C., September 1995.
7. Graham NMH, Galai N, Nelson KE, et al. Effect of isoniazid chemoprophylaxis on HIV-related mycobacterial disease. Arch Intern Med 1996;156: 889–94.
8. Markowitz N, Hansen NI, Hopewell PC, et al. Incidence of tuberculosis in the United States among HIV-infected persons. Ann Intern Med 1997;126: 123–32.

Submitted by James Gollop, M.D., M.P.H., Acting Chief, Tuberculosis Branch, Hawaii State Department of Health.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Sept 97	Oct 97	Total YTD
Specimens Tested	9,809	9,696	96,964
Initial (percent)	70.0%	70.0%	64,025
Repeat (percent)	30.0%	30.0%	32,939
Specimens: Unsatisfactory	105	103	1,790
HT Borderline	872	850	8,572
HT Presumptive	19	21	205
PKU Borderline	1	0	5
PKU Presumptive Positive	0	0	8
GAL Borderline	7	8	295
GAL Presumptive Positive	2	2	33
FAS (Sickle cell trait)	88	94	802
FAC (Hb C trait)	19	25	226
FAX (Hb variant)	13	13	142
FS (Sickle cell disease)	1	6	22
FSC (Sickle C disease)	1	0	11
FC (Hb C disease)	0	0	4

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

VIDEOCONFERENCE

Epidemiology and Prevention of Vaccine-Preventable Diseases

The Bureau of Immunization will sponsor the Centers for Disease Control and Prevention satellite broadcasts "Epidemiology and Prevention of Vaccine-Preventable Diseases" on four consecutive Thursdays this spring: April 9, 16, 23 and 30. Please mark the dates on your calendar.

Topics to be discussed include: Principles of Vaccination, General Recommendations of Immunization, the Childhood Immunization Initiative, as well as the individual vaccines. The broadcasts will feature question-and-answer sessions in which participants nationwide can address questions to the course instructors on toll-free telephone lines. Continuing education credits will be offered for a variety of professions.

For more information about the course, site locations and broadcast times, please contact the immunization representative located in each of the district health offices or the Bureau of Immunization at (573)751-6133.

1997 Index for *Missouri Epidemiologist*

KEY

J/F97 = January/February 1997
M/A97 = March/April 1997
M/J97 = May/June 1997
J/A97 = July/August 1997
S/O97 = September/October 1997
N/D97 = November/December 1997

MOHSAIC

(continued from page 5)

that allows the sharing of immunization information without parental/guardian consent. These include amendments to sections 167.183, 210.003, and 192.068, RSMo. DOH staff have also addressed the need to limit access to this information and created a means to track access to and changes in data.

DOH is working with managed care organizations to introduce the capabilities of MOHSAIC and to identify ways they or private providers can enter and retrieve data. Ways to participate in MOHSAIC include:

- Collaborate with the local public health agency to manually enter records.
- Dial into MOHSAIC to view records or directly enter immunization records for clients not already in the central registry.
- Establish a direct line to MOHSAIC for larger pediatric providers.

DOH staff are also researching the feasibility of abstracting immunization information from electronic billing or patient management systems to merge with the central registry data.

For more information on MOHSAIC or to learn how to participate, contact the DOH Bureau of Immunization at (573) 751-6133 or the Center for Health Information Management and Epidemiology at (573) 751-6272.

REFERENCE:

1. Institute of Medicine. The future of public health. Washington DC: National Academy Press, 1989.

UPCOMING CONFERENCE:

Osteoporosis Clinical Update, 1998

May 2, 1998
Ritz Carlton
Kansas City, MO

This conference is for physicians and allied health professionals. Five CME credit hours are available.

For more information and/or registration form, please contact:

Virginia Beatty
Missouri Department of Health
(573) 876-3209
or
Barbara Sterkel, M.D.
Missouri Osteoporosis Foundation
(314) 454-5951

LATE BREAKERS

☞ Revised Vaccine Information Materials for diphtheria/tetanus/pertussis (DTP, DTaP, Td) are now available from the Bureau of Immunization. The Bureau of Immunization is mailing camera-ready copies of the Missouri version of these revised vaccine information materials to physicians and local public health agencies. If you need a copy, please contact the Bureau of Immunization at (573) 751-6133.

Under the National Childhood Vaccine Injury Act, the Centers for Disease Control and Prevention (CDC) must develop informational materials that health care providers are required to distribute to patients or parents of patients before each dose of specific vaccine is administered. CDC announced the availability of the revised vaccine information materials in the *Federal Register* on January 9, 1998.

Other vaccines covered under the Act are measles, mumps, rubella and polio. All health care providers are required to record in the patient's permanent medical record the date and version of materials provided as well as the provider administering the vaccine, the date of administration, manufacturer and lot number of vaccine used.

☞ **Vaccines for Children (VFC) Update for 1998:**

Beginning March 1, 1998, any adolescent who is eligible for VFC may receive the hepatitis B vaccine. Providers should make every effort to vaccinate adolescents before they reach age 19.

The following are the minimum intervals between hepatitis B immunizations:

Dose 1 and 2: 1 month (4 weeks–28 days)
Dose 1 and 3: 4 months (16 weeks–112 days)
Dose 2 and 3: 2 months (8 weeks–56 days)

If you have questions, please contact the immunization representative located in each of the district health offices or the Bureau of Immunization at (800) 699-2313.

☞ The Bureau of Immunization has a new toll-free telephone number. The number is (800) 699-2313.

Missouri
EPIDEMIOLOGIST

Published by the
Missouri Department of Health
P.O. Box 570
Jefferson City, MO 65102-0570
www.health.state.mo.us

The *Missouri Epidemiologist* is a regularly scheduled bimonthly newsletter published jointly by the Office of Epidemiology, Center for Health Information Management and Epidemiology (CHIME) and the Division of Environmental Health and Communicable Disease Prevention (EHCDP). CHIME's responsibilities include managing health statistical systems, epidemiological functions and information systems of the department. EHCDP's responsibilities include the prevention and control of communicable diseases and environmentally induced illnesses, including the requisite epidemiological investigations.

The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272.

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Office of Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

Public Health Week
April 6–12, 1998

Public Health Week will be recognized in Missouri and around the nation April 6–12, 1998. The theme of this year's celebration is *Healthy People in Healthy Communities*. The Department of Health, the Missouri Public Health Association and the Missouri Association of Local Public Health Administrators are collaborating to encourage celebration of Public Health Week around the state.

Public health professionals and agencies at all levels are encouraged to showcase their many accomplishments in protecting individual and community health.

While most people don't think about it, local public health services have an impact on almost everything we do in a day. From giving immunizations to children, to inspecting restaurants for sanitation, providing birth certificates and testing the quality of well water, public health touches all aspects of our health and safety.

For more information, please contact Nanci Gonder, Public Information Officer, Missouri Department of Health, at (573) 751-6062; Lorna Wilson, Executive Director, Missouri Association of Local Public Health Administrators, at (573) 659-8828; or Nancy Jones, President, Missouri Public Health Association, at (314) 658-1123.

Missouri EPIDEMIOLOGIST

Volume 20, Number 2 *March-April 1998*

Surveillance for Avian Influenza A(H5N1)

Mary E. Kliethermes, B.N., B.S.
Bureau of Communicable Disease Control

At the request of the Centers for Disease Control and Prevention (CDC), the Missouri Department of Health, Bureau of Communicable Disease Control has developed a state plan to perform hospital-based surveillance for influenza A(H5N1). The objective of the study is to rapidly identify an importation into the United States of influenza A(H5N1) from Asia while minimizing the disruption of existing health care delivery systems. Based on the experience in Hong Kong, hospital-based surveillance for severe illness would be an efficient and effective approach to detect the introduction of influenza A(H5N1) viruses into the United States.

Influenza A (H5N1) virus infections have been confirmed in 18 persons in Hong Kong and have caused concern among the general public, policy makers, and public health officials about the possibility for pandemic spread. Available evidence indicates that there have been two genetically different strains of A(H5N1) involved in these cases in Hong Kong and these viruses are inefficiently transmitted relative to classical human influenza viruses. Episodes of person-to-person spread or infection in laboratory workers and health care workers has not been clearly documented to date.

Influenza activity typically has two annual peaks in Hong Kong, the first during March and then a larger peak during July. Influenza activity due predominantly to influenza A (H3N2) viruses decreased during December and January in Hong Kong. While avian influenza A(H5N1) does not appear to be easily transmitted among humans, increased circulation of human influenza strains during the next few months increases the potential for reassortment between a human influenza A virus and an avian influenza A(H5N1) virus. Such a reassortment has the potential to produce a strain with antigenic characteristics for which immunity in humans does not exist. If the H5N1 virus develops the ability to be efficiently transmitted from person to person, the virus could spread worldwide very rapidly.

The Bureau of Communicable Disease Control is requesting hospitals to submit nasopharyngeal and throat swabs to the Missouri State Public Health Laboratory for viral culturing from patients who meet the criteria for screening. See criteria for screening given above.

The culture should be obtained using a cotton or Dacron swab and placed in viral transport media. The specimen should be kept cold and prepared for shipping as soon as possible. Place the specimen between refrigerant pillows in a styrofoam box and pack to prevent breakage. The pillows must be frozen when the box is packed for shipment to maintain the specimen at proper temperature.

The specimen should be shipped using a method that will facilitate delivery to the State Public Health Laboratory in the

(continued on page 2)

Criteria for Influenza A(H5N1) Screening

(Patients must meet all criteria listed below.)

- Hospitalized with unexplained pneumonia or adult respiratory distress syndrome,
- Fever (temperature >100ºF),
- Age ≥1 year and ≤60 years and
- Traveled to Asia or contact with an ill person who traveled to Asia within 10 days before onset of symptoms.

Inside this Issue...

Disease Reporting

During working hours:
Cases of reportable diseases and conditions should be reported promptly to your local health department, or to the Missouri Department of Health at **(800) 392-0272**.

Disease Emergencies:
When the reportable disease represents an emergency requiring immediate public health action, you can reach the Department of Health duty officer after hours, weekends or holidays at **(573) 751-4674**.

(continued from page 1)
shortest length of time. Address the package to Missouri State Public Health Laboratory, Attn: Mike Hanauer, Virology Unit, 307 West McCarty Street, Jefferson City, MO 65101

It is **very important** to include with the specimen the name of the submitting hospital, address, phone number and laboratory contact person; physician's name; patient's name, address and birth date; date specimen was collected; date of onset of illness; and source of specimen.

Questions regarding specimen collection, collection kits and mailing procedures should be referred to Kelly Carlson or Mike Hanauer at the Missouri State Public Health Laboratory at (573) 751-0633.

For further information on the United States hospital-based H5N1 surveillance initiative, or if you have questions regarding participation in the surveillance program, please contact Liz Kliethermes, Assistant Health Program Administrator, Bureau of Communicable Disease Control at (573) 751-6113 or (800) 392-0272.

If no resurgence of influenza A(H5N1) activity occurs in Hong Kong and no spread of influenza A(H5N1) viruses is detected outside Hong Kong, hospital-based surveillance for H5N1 viruses can be discontinued at the end of September 1998.

Pandemic Influenza Planning Exercise

Georgia Storm, R.N.
Bureau of Immunization

The Missouri Department of Health in cooperation with the State Emergency Management Agency (SEMA) sponsored a two-day exercise in February to review the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE) national planning guide for pandemic influenza. The exercise was called FLUEX '98 and was held at the State Emergency Operations Center in Jefferson City, MO. Missouri was one of five states funded by CDC to pilot test the planning guide.

Approximately 110 professionals from various state agencies, local public health agencies, nonprofit organizations and other health and emergency organizations participated in FLUEX '98.

The agenda for the first day included background information on the history of influenza epidemics, the challenges an influenza pandemic would pose, influenza microbiology and epidemiology and descriptions of how SEMA and the Federal Emergency Management Agency (FEMA) operate and what services they provide. Ray Strikas, M.D., Chief of Adult Immunization, National Immunization Program, CDC presented an overview of the national pandemic influenza plan.

A tabletop exercise was held on the second day. Participants were divided into four groups, each group representing a different area of the state. Each group was asked to review the four sections of the national planning guide:

- Laboratory and Disease-Based Surveillance
- Vaccine Delivery
- Communications
- Coordination and Emergency Preparedness and Response

After the review, groups presented their comments on the usefulness of the national guide and suggestions for change.

Missouri's response to the national pandemic influenza plan was presented to CDC and CSTE representatives at a meeting held in Atlanta on April 7–8. Recommendations for change to the national plan were made in response to comments received at that meeting.

Information gathered from FLUEX '98 will be used to plan for an influenza pandemic in Missouri. The Department of Health plans to review its Emergency Response Plan and make necessary revisions to reference and incorporate the pandemic influenza planning guide. SEMA will coordinate a review of the state's all-hazards plan and make any necessary revisions to address an influenza pandemic.

Influenza

For those of you wishing to bookmark an Internet site for the most current influenza information from the Centers for Disease Control and Prevention (CDC), try:

http://www.cdc.gov/ncidod/diseases/fluvirus.htm

This site includes the most recent CDC surveillance reports and information on antivirals for influenza A, vaccines, international trends, and the emergent influenza A(H5N1) viruses recently isolated in Hong Kong.

Missouri Department of HEALTH

Mel Carnahan
Governor

Maureen E. Dempsey, M.D.
Director

P.O. Box 570, Jefferson City, MO 65102-0570 • 573-751-6400 • FAX 573-751-6010

Dear Doctor:

Tuberculosis increased in Missouri by 10.7% during 1997 and we need your help in controlling this disease and working toward its elimination in this state by the year 2010. The Missouri Department of Health's Bureau of Tuberculosis Control needs your help in the following ways:

- Educate your patients about a strategy called directly observed therapy (DOT). DOT is a strategy that is used to ensure that patients take their tuberculosis (TB) medications as prescribed and complete their six months of treatment. Health professionals and non-health professionals can be trained to conduct DOT by simply watching a patient swallow their pills. You can think of this as a reminder system or buddy system since most people are not compliant with taking medications for such a long period of time.

  Work with your local health department to ensure that your patients are directly observed taking their TB medications. Our first priority is to have the patient go to the local health department to receive DOT for active disease. However, if a patient cannot travel to the local health department for this service, then the local health department and you might be able to identify someone else who can conduct DOT. Other possible sources include family members, friends, neighbors, or other community members such as local ministers, pharmacists, staff in physician offices, retired persons, nurses in schools and others.

  The medication dosage can be adjusted so that patients can be directly observed twice a week instead of daily.

  DOT has been adopted as the standard of care in Missouri. The use of this strategy also is recommended by the Centers for Disease Control and Prevention (CDC) in Atlanta. Areas of the country that have fully embraced DOT have witnessed significant decreases in active disease cases. These areas include Baltimore, Maryland; Fort Worth, Texas; New York City; and the state of Mississippi.

- Areas of Missouri that do not have many, or any, active disease patients should turn their attention to directly observing those patients who are TB infected without disease. This is called directly observed preventive therapy (DOPT). It's better to begin this process slowly and not become overwhelmed since more patients have TB infection than TB disease.

- Utilize four TB medications initially in treating active disease. The four TB medications that are recommended are isoniazid, rifampin, pyrazinamide and ethambutol. The use of ethambutol can be thought of as an insurance policy in terms of blocking or preventing rifampin resistance.

Your assistance with using four TB medications initially for active disease plus encouraging and educating patients about DOT/DOPT will make a difference and have an impact on this disease. If you have any questions, please call the Bureau of Tuberculosis Control at (573) 751-6122 or your local health department. Your help is very much appreciated.

Sincerely,

Vic Tomlinson
Chief
Section of Vaccine Preventable and Tuberculosis Disease Elimination

This letter was mailed in April to Missouri pulmonologists, infectious disease physicians and those in the TB diagnostic services program. All physicians who treat TB are encouraged to use directly observed therapy, the state of the art method for decreasing transmission of TB and assuring better clinical benefits.

Syphilis Outbreak in the Missouri Bootheel

Office of Epidemiology
Bureau of STD/HIV Prevention

The Bootheel region* of southeastern Missouri is currently experiencing an outbreak of syphilis. From January 1997 through April 15, 1998, 79 cases of early syphilis§ have been reported from this seven county area; 34 (43.0%) of these cases have been reported in the first 3½ months of this year. Demographic characteristics of cases reported in 1997 and through April 15, 1998, are summarized in Table 1. The majority of the cases (83.5%) have been in African Americans, but cases in whites are also occurring. The location of early syphilis cases reported since January 1, 1998, in southeast Missouri is shown in Figures 1 and 2. Almost half (47.1%) of these cases, have been from Scott County, with most being from the Sikeston area.

* Butler, Dunklin, Mississippi, New Madrid, Pemiscot, Scott, and Stoddard Counties.

§ Primary, secondary, and early latent (less than one year duration) syphilis.

Table 1. P&S and Early Latent Syphilis Cases by Gender, Race and Age Group, Missouri Bootheel*, Reported in 1997 and Through April 15, 1998

	P&S SYPHILIS				EARLY LATENT SYPHILIS			
	REPORTED 1997		REPORTED 1998**		REPORTED 1997		REPORTED 1998**	
GENDER								
MALES	6	50.0%	7	70.0%	12	36.4%	12	50.0%
FEMALES	6	50.0%	3	30.0%	21	63.6%	12	50.0%
RACE								
WHITE	1	8.3%	1	10.0%	4	12.1%	6	25.0%
BLACK	11	91.7%	9	90.0%	28	84.8%	18	75.0%
UNKNOWN	0	0.0%	0	0.0%	1	3.0%	0	0.0%
RACE AND GENDER								
WHITE MALES	0	0.0%	1	10.0%	0	0.0%	1	4.2%
BLACK MALES	6	50.0%	6	60.0%	11	33.3%	11	45.8%
UNKNOWN MALES	0	0.0%	0	0.0%	1	3.0%	0	0.0%
WHITE FEMALES	1	8.3%	0	0.0%	4	12.1%	5	20.8%
BLACK FEMALES	5	41.7%	3	30.0%	17	51.5%	7	29.2%
UNKNOWN FEMALES	0	0.0%	0	0.0%	0	0.0%	0	0.0%
AGE GROUP								
15–19	0	0.0%	0	0.0%	4	12.1%	7	29.2%
20–24	4	33.3%	4	40.0%	6	18.2%	8	33.3%
25–29	1	8.3%	2	20.0%	6	18.2%	3	12.5%
30–34	3	25.0%	1	10.0%	4	12.1%	2	8.3%
35–39	1	8.3%	1	10.0%	3	9.1%	1	4.2%
40+	3	25.0%	2	20.0%	10	30.3%	3	12.5%
TOTAL	**12**		**10**		**33**		**24**	

* Butler, Dunklin, Mississippi, New Madrid, Pemiscot, Scott and Stoddard Counties
** Through April 15, 1998

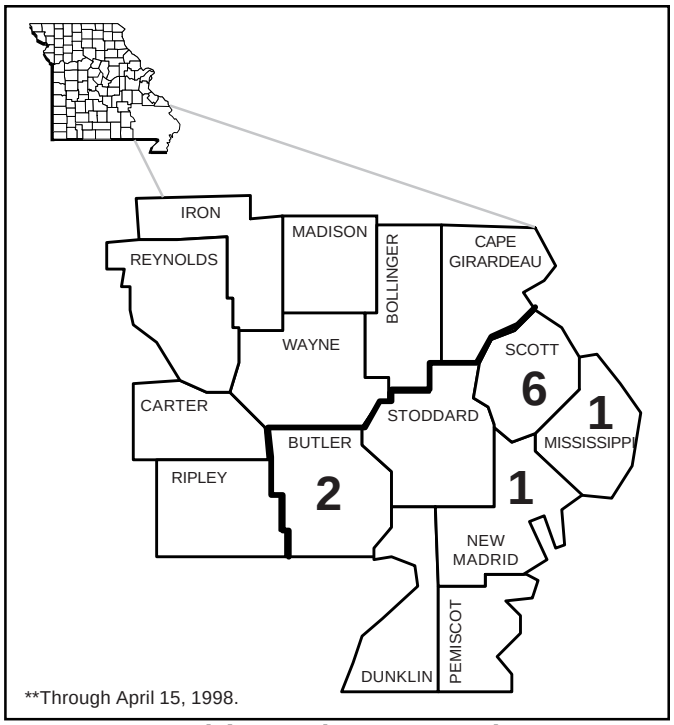


Figure 1. P&S syphilis cases by county, Southeast Missouri, 1998**

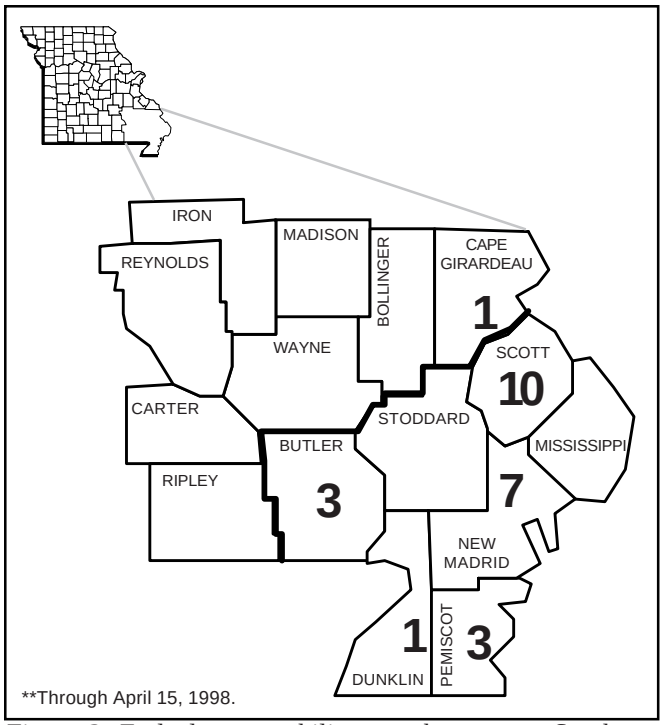


Figure 2. Early latent syphilis cases by county, Southeast Missouri, 1998**

Syphilis is a disease of particular concern because of the severe damage it can cause in infected fetuses and congenitally infected infants, and in persons with neurosyphilis and with late stage manifestations that may involve multiple organ systems. In addition, it is clear that the presence of genital ulcers such as those caused by syphilis enhance by several fold the efficiency of sexual transmission of HIV.[1,2] Fortunately, syphilis can be effectively treated with antibiotics, and if it is diagnosed in a timely manner, severe disease manifestations can be prevented.

It is important for medical providers to report all cases of syphilis immediately to the local health department, or to the Missouri Department of Health at (573) 751-6463. Prompt reporting allows specially trained public health outreach workers to offer timely assistance with partner elicitation and notification services, maximizing the opportunity to locate and treat additional infected persons, and prevent further transmission from occurring. (Reporting of syphilis cases is required by Missouri law.)

All medical providers need to be aware of the possibility of syphilis and other sexually transmitted diseases (STDs) in their patients. It is important to perform an appropriate sexual history and STD risk assessment on patients, which may include questions about illicit drug use and exchange of sex for money or drugs. Evaluation of a patient for STDs clearly requires a careful physical examination that includes examination of the skin (including the palms, soles, and flexor surfaces of the forearms), mouth, pharynx, and lymph nodes, as well as the genital area (including a pelvic exam in females) and the perineum and anal area. Patients suspected of having syphilis should have a neurological exam, remembering that central nervous system disease can occur during any stage of syphilis. Evaluation of infants and children suspected of having congenital syphilis should be according to current Centers for Disease Control and Prevention (CDC) guidelines (see below).

Certain features of syphilis can be associated with delays in diagnosis. Syphilis has manifold manifestations, and its presentation can be subtle. If the clinician is not alert, the diagnosis could be missed. In addition, early syphilis symptoms tend to be mild and painless, and as a result, the individual may not seek medical care. (However, because of the painless nature of the lesions, the person may continue to engage in sexual activity that can expose others to infection.)

Management of syphilis and other STDs is described in detail in the new CDC STD treatment guidelines.[3] The sections of these guidelines which address genital ulcer diseases and congenital syphilis are reprinted elsewhere in this issue.[†] The following points regarding syphilis diagnosis and treatment should be emphasized:

- In a patient with genital ulcer disease, a diagnosis based only on the medical history and physical examination often is inaccurate. Therefore, evaluation of all patients who have genital ulcers should include a serologic test for syphilis (RPR or VDRL) and diagnostic evaluation for herpes. (It is also strongly recommended that appropriate tests for gonorrhea, chlamydial infection, and HIV infection be performed, remembering that persons with any of these infections may not have evident signs or symptoms of disease.) Testing for HIV infection should definitely be offered to all patients diagnosed with syphilis.

- If a patient presents with a genital ulcer and has a negative nontreponemal test for syphilis (RPR, VDRL), the possibility that this represents a false-negative test result should be considered. It is important to remember that the sensitivity of nontreponemal tests varies with the levels of antibodies present during the different stages of disease. In early primary syphilis, when antibody levels may be too low to detect, results may be nonreactive, and the sensitivity of nontreponemal tests is 62–76%. Antibody levels rise as the disease progresses; titers usually peak during secondary syphilis, when the sensitivity of nontreponemal tests approaches 100%.[4]

- Parenteral penicillin G is the preferred drug for treatment of all stages of syphilis, and is the only therapy with documented efficacy for syphilis during pregnancy or for neurosyphilis. The CDC guidelines state that pregnant patients who are allergic to penicillin should be desensitized, if necessary, and treated with penicillin. Patients with neurosyphilis who report being allergic to penicillin should either be desensitized to penicillin or be managed in consultation with an expert.

- Following treatment for primary and secondary syphilis, patients should be reexamined clinically and serologically at both 6 months and 12 months; more frequent evaluation may be prudent if follow-up is uncertain. Following treatment for latent syphilis, patients should be reexamined clinically and serologically at 6, 12, and 24 months.

Appropriate evaluation and treatment of a syphilis patient's sex partner(s) is important for the partner(s) as well as for preventing further spread of infection to others, including preventing the index patient from potentially becoming reinfected. Current CDC recommendations for management of sexual contacts state that persons exposed sexually to a patient who has syphilis in any stage should be evaluated clinically and serologically as follows:

- Persons who were exposed within the 90 days preceding the diagnosis of

(continued on page 6)

[†] See pages 7 to 26. The sections from the CDC guidelines which address diseases characterized by urethritis and cervicitis (such as gonorrhea and chlamydial infections) were reprinted in the January-February 1998 issue of the *Missouri Epidemiologist*. The complete 1998 CDC STD treatment guidelines are available on the World Wide Web at http://www.cdc.gov/nchstp/dstd/dstdp.html.

(continued from page 5)

primary, secondary, or early latent syphilis in a sex partner might be infected even if seronegative; therefore, such persons should be treated presumptively.

- Persons who were exposed >90 days before the diagnosis of primary, secondary, or early latent syphilis in a sex partner should be treated presumptively if serologic test results are not available immediately and the opportunity for follow-up is uncertain.
- For purposes of partner notification and presumptive treatment of exposed sex partners, patients with syphilis of unknown duration who have high nontreponemal serologic test titers (i.e., ≥1:32) may be considered as having early syphilis. (However, serologic titers should not be used to differentiate early from late latent syphilis for the purpose of determining treatment.)

Since January 1997, no cases of congenital syphilis have been reported from the Bootheel region. However, the outbreak of early syphilis in this area indicates that the potential for congenital syphilis cases is definitely present. Medical providers who care for pregnant women are required by Missouri law to obtain, with the consent of the patient, a serologic test for syphilis on each pregnant woman at, or within 20 days of, her first visit for prenatal care. Because of the syphilis outbreak in southeast Missouri, and the continuing occurrence of syphilis in the St. Louis region, the Missouri Department of Health is currently recommending that providers in these areas perform additional serologic testing (and a repeat sexual history) twice during the third trimester: at 28 weeks of gestation and at delivery. No infant should leave the hospital without the maternal serologic status having been documented at least once during pregnancy. Any woman who delivers a stillborn infant after 20 weeks of gestation should be tested for syphilis. Also, it is especially important that all pregnant women who have syphilis undergo voluntary testing for HIV infection.[††]

Medical providers should remain up-to-date on the epidemiology, diagnosis, and treatment of syphilis and other STDs. Physicians, nurses, and other health professionals in Missouri who care for patients with STDs have access to a variety of training opportunities offered through the St. Louis STD/HIV Prevention Training Center. Information on upcoming courses can be obtained by calling (314) 747-0294, faxing (314) 362-1872, or visiting the Center's web site at http://www.umsl.edu/services/itc/std_ptc.html. Clinically oriented educational materials are available on the National STD/HIV Prevention and Training Center Network web site at http://129.137.232.101/stdptc.html (see "Educational Resources").

Finally, local and state public health officials have developed a three-part plan to address the current syphilis outbreak in the Bootheel region, and to help prevent the recurrence of the disease in this area in the future. The components of the plan are:

1. Immediate outbreak response, which includes investigation of syphilis cases and contacts, medical evaluation and presumptive treatment of contacts, syphilis screening projects in high risk populations, and provision of appropriate education to at-risk groups and to the general public.
2. Meetings between local health departments and clinical partners to improve diagnosis, treatment, reporting, follow-up and prevention of syphilis (and other STDs).
3. Meetings between public health officials and community members to identify and help implement mechanisms to improve the health of the community.

Conclusion

Since 1992, when a significant syphilis outbreak involving almost 200 reported cases occurred in the Bootheel region, there has been concern about a possible reemergence of the disease in this area. The present outbreak indicates that this concern was justified. Health care providers play a vital role in preventing the occurrence of syphilis and other STDs through appropriate evaluation, diagnosis, treatment, reporting, and follow-up practices. All patients engaging in high risk sexual behaviors should be provided education and counseling. Through the cooperative efforts of private medical providers, public health officials, and other concerned persons in the community, outbreaks of diseases such as syphilis can be effectively controlled.

REFERENCES

1. Vermund SH. Transmission of HIV-1 among adolescents and adults, in DeVita VT, et al, eds. AIDS: Biology, Diagnosis, Treatment and Prevention (4th Ed);Philadelphia: Lippincott-Raven, 1997.
2. Royce RA, et al. Sexual transmission of HIV. N Engl J Med 1997;336:1072–78.
3. CDC. 1998 Guidelines for treatment of sexually transmitted diseases. MMWR 1998;47(No. RR-1):18, 28–49.
4. U.S. Preventive Services Task Force. Guide to Clinical Preventive Services (2nd Ed), 1996:288.
5. Missouri Department of Health Policy to Reduce the Risk of Perinatal HIV Transmission in Missouri. Missouri Epidemiologist 1996;18(2):1–4.

[††] DOH has recommended that prenatal care for **all** women should routinely include HIV education and counseling, and each pregnant woman should be encouraged to undergo voluntary HIV testing. HIV education, counseling and voluntary testing should be offered at the initial prenatal visit. Uninfected pregnant women who continue to practice high-risk behaviors (e.g., injecting-drug use and/or unprotected sexual contact with an HIV-infected or high-risk partner) should be encouraged and assisted to avoid further exposure to HIV, and to be retested for HIV in the third trimester of pregnancy.[5]

1998 Guidelines for Treatment of Sexually Transmitted Diseases

(Continued from the January-February 1998 issue of the *Missouri Epidemiologist*)

Physicians and other health-care providers have a critical role in preventing and treating sexually transmitted diseases (STDs). The following recommendations for the treatment of STDs, which were developed by the Centers for Disease Control and Prevention (CDC) in consultation with a group of outside experts, are intended to assist with that effort.

The recommendations, which update those released by CDC in 1993, were reprinted from CDC's *Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports*, Vol. 47, No. RR-1, January 23, 1998. This issue of the *Missouri Epidemiologist* contains those sections of the guidelines which relate to diseases characterized by genital ulcers and congenital syphilis. Those sections relating to diseases characterized by urethritis and cervicitis were reprinted in the January-February 1998 issue. A full copy of the guidelines in pdf format can be found on the Missouri Department of Health (DOH) Home Page at **http://www.health.state.mo.us/cgi-bin/uncgi/ShowPDF?DocumentName=1998+STD+TreatmentGuide&DocumentSource=STDGuide** and also on CDC's Division of STD Prevention Home Page at **http://www.cdc.gov/nchstp/dstd/dstdp.html**.

If you have questions regarding these guidelines, please contact DOH's Bureau of STD/HIV Prevention at (573) 751-6141.

Additional information for medical providers on STDs and STD training courses is available on the Internet at the following sites:

CDC's Division of STD Prevention:
http://www.cdc.gov/nchstp/dstd/dstdp.html

CDC's Division of AIDS, STD, and TB Laboratory Research:
http://www.cdc.gov/ncidod/dastlr/dastlr.html

National Network of STD/HIV Prevention Training Centers:
http://129.137.232.101/STDPTC.html

St. Louis STD/HIV Prevention Training Center:
http://www.umsl.edu/services/itc/std_ptc.html
Ph: (314) 747-0294 or 747-1522

Medline - National Library of Medicine:
http://igm.nlm.nih.gov/

Diseases Characterized by Genital Ulcers

Congenital Syphilis

Diseases Characterized by Genital Ulcers

MANAGEMENT OF PATIENTS WHO HAVE GENITAL ULCERS

In the United States, most young, sexually active patients who have genital ulcers have either genital herpes, syphilis, or chancroid. The relative frequency of each differs by geographic area and patient population; however, in most areas of the United States, genital herpes is the most prevalent of these diseases. More than one of these diseases could be present in a patient who has genital ulcers. Each disease has been associated with an increased risk for HIV infection.

A diagnosis based only on the patient's medical history and physical examination often is inaccurate. Therefore, evaluation of all patients who have genital ulcers should include a serologic test for syphilis and diagnostic evaluation for herpes. Although, ideally, all of these tests should be conducted for each patient who has a genital ulcer, use of such tests (other than a serologic test for syphilis) may be based on test availability and clinical or epidemiologic suspicion. Specific tests for the evaluation of genital ulcers include the following:

- Darkfield examination or direct immunofluorescence test for *Treponema pallidum*,
- Culture or antigen test for herpes simplex virus (HSV), and
- Culture for *Haemophilus ducreyi*.

Polymerase chain reaction (PCR) tests for these organisms might become available commercially.

HIV testing should be
a) performed in the management of patients who have genital ulcers caused by *T. pallidum* or *H. ducreyi* and
b) considered for those who have ulcers caused by HSV
(see sections on Syphilis and Genital Herpes).

A health-care provider often must treat a patient before test results are available. In such a circumstance, the clinician should treat for the diagnosis considered most likely. If the diagnosis is unclear, many experts recommend treatment for syphilis, or for both syphilis and chancroid if the patient resides in a community in which *H. ducreyi* is a significant cause of genital ulcers, especially when diagnostic capabilities for chancroid or syphilis are not ideal. However, even after complete diagnostic evaluation, at least 25% of patients who have genital ulcers have no laboratory-confirmed diagnosis.

CHANCROID

Chancroid is endemic in some areas of the United States, and the disease also occurs in discrete outbreaks. Chancroid is a cofactor for HIV transmission, and high rates of HIV infection among patients who have chancroid have been reported in the United States and other countries. An estimated 10% of patients who have chancroid could be coinfected with *T. pallidum* or HSV.

A definitive diagnosis of chancroid requires identification of *H. ducreyi* on special culture media that are not widely available from commercial sources; even using these media, sensitivity is ≤80%. A probable diagnosis, for both clinical and surveillance purposes, may be made if the following criteria are met: a) the patient has one or more painful genital ulcers; b) the patient has no evidence of *T. pallidum* infection by darkfield examination of ulcer exudate or by a serologic test for syphilis performed at least 7 days after onset of ulcers; and c) the clinical presentation, appearance of genital ulcers, and regional lymphadenopathy, if present, are typical for chancroid and a test for HSV is negative. The combination of a painful ulcer and tender inguinal adenopathy, which occurs among one third of patients, suggests a diagnosis of chancroid; when accompanied by suppurative inguinal adenopathy, these signs are almost pathognomonic. PCR testing for *H. ducreyi* might become available soon.

Treatment

Successful treatment for chancroid cures the infection, resolves the clinical symptoms, and prevents transmission to others. In extensive cases, scarring can result despite successful therapy.

Recommended Regimens

Azithromycin 1 g orally in a single dose,

OR

Ceftriaxone 250 mg intramuscularly (IM) in a single dose,

OR

Ciprofloxacin 500 mg orally twice a day for 3 days,

OR

Erythromycin base 500 mg orally four times a day for 7 days.

NOTE: Ciprofloxacin is contraindicated for pregnant and lactating women and for persons aged <18 years.

All four regimens are effective for treatment of chancroid in HIV-infected patients. Azithromycin and ceftriaxone offer the advantage of single-dose therapy. Worldwide, several isolates with intermediate resistance to either ciprofloxacin or erythromycin have been reported.

Other Management Considerations

Patients who are uncircumcised and HIV-infected patients might not respond as well to treatment as those who are circumcised or HIV-negative. Patients should be tested for HIV infection at the time chancroid is diagnosed. Patients should be retested 3 months after the diagnosis of chancroid if the initial test results for syphilis and HIV were negative.

Follow-Up

Patients should be reexamined 3–7 days after initiation of therapy. If treatment is successful, ulcers improve symptomatically within 3 days and objectively within 7 days after therapy. If no clinical improvement is evident, the clinician must consider whether a) the diagnosis is correct, b) the patient is coinfected with another STD, c) the patient is infected with HIV, d) the treatment was not taken as instructed, or e) the *H. ducreyi* strain causing the infection is resistant to the prescribed antimicrobial.

The time required for complete healing depends on the size of the ulcer; large ulcers may require >2 weeks. In addition, healing is slower for some uncircumcised men who have ulcers under the foreskin. Clinical resolution of fluctuant lymphadenopathy is slower than that of ulcers and may require drainage, even during otherwise successful therapy. Although needle aspiration of buboes is a simpler procedure, incision and drainage of buboes may be preferred because of less need for subsequent drainage procedures.

Management of Sex Partners

Sex partners of patients who have chancroid should be examined and treated, regardless of whether symptoms of the disease are present, if they had sexual contact with the patient during the 10 days preceding onset of symptoms in the patient.

Special Considerations

Pregnancy

The safety of azithromycin for pregnant and lactating women has not been established. Ciprofloxacin is contraindicated during pregnancy. No adverse effects of chancroid on pregnancy outcome or on the fetus have been reported.

HIV Infection

HIV-infected patients who have chancroid should be monitored closely. Such patients may require longer courses of therapy than those recommended for HIV-negative patients. Healing may be slower among HIV-infected patients, and treatment failures occur with any regimen. Because data are limited concerning the therapeutic efficacy of the recommended ceftriaxone and azithromycin regimens in HIV-infected patients, these regimens should be used for such patients only if follow-up can be ensured. Some experts suggest using the erythromycin 7-day regimen for treating HIV-infected persons.

GENITAL HERPES SIMPLEX VIRUS (HSV) INFECTION

Genital herpes is a recurrent, incurable viral disease. Two serotypes of HSV have been identified: HSV-1 and HSV-2. Most cases of recurrent genital herpes are caused by HSV-2. On the basis of serologic studies, genital HSV-2 infection has been diagnosed in at least 45 million persons in the United States.

Most HSV-2–infected persons have not received a diagnosis of genital herpes. Such persons have mild or unrecognized infections that shed virus intermittently in the genital tract. Some cases of first-episode genital herpes are manifested by severe disease that might require hospitalization. Many cases of genital herpes are transmitted by persons who are unaware that they have the infection or are asymptomatic when transmission occurs.

Systemic antiviral drugs partially control the symptoms and signs of herpes episodes when used to treat first clinical episodes or recurrent episodes or when used as daily suppressive therapy. However, these drugs neither eradicate latent virus nor affect the risk, frequency, or severity of recurrences after the drug is discontinued. Randomized trials indicate that three antiviral medications provide clinical benefit for genital herpes: acyclovir, valacyclovir, and famciclovir. Valacyclovir is a valine ester of acyclovir with enhanced absorption after oral administration. Famciclovir, a prodrug of penciclovir, also has high oral bioavailability. Topical therapy with acyclovir is substantially less effective than the systemic drug, and its use is discouraged. The recommended acyclovir dosing regimens for both initial and recurrent episodes reflect substantial clinical experience, expert opinion, and FDA-approved dosages.

First Clinical Episode of Genital Herpes

Management of patients with first clinical episode of genital herpes includes antiviral therapy and counseling regarding the natural history of genital herpes, sexual and perinatal transmission, and methods to reduce such transmission. Five percent to 30% of first-episode cases of genital herpes are caused by HSV-1, but clinical recurrences are much less frequent for HSV-1 than HSV-2 genital infection. Therefore, identification of the type of the infecting strain has prognostic importance and may be useful for counseling purposes.

Recommended Regimens

Acyclovir 400 mg orally three times a day for 7–10 days,

OR

Acyclovir 200 mg orally five times a day for 7–10 days,

OR

Famciclovir 250 mg orally three times a day for 7–10 days,

OR

Valacyclovir 1 g orally twice a day for 7–10 days.

NOTE: Treatment may be extended if healing is incomplete after 10 days of therapy.

Higher dosages of acyclovir (i.e., 400 mg orally five times a day) were used in treatment studies of first-episode herpes proctitis and first-episode oral infection, including stomatitis or pharyngitis. It is unclear whether these forms of mucosal infection require higher doses of acyclovir than used for genital herpes. Valacyclovir and famciclovir probably are also effective for acute HSV proctitis or oral infection, but clinical experience is lacking.

Counseling is an important aspect of managing patients who have genital herpes. Although initial counseling can be provided at the first visit, many patients benefit from learning about the chronic aspects of the disease after the acute illness subsides. Counseling of these patients should include the following:

- Patients who have genital herpes should be told about the natural history of the disease, with emphasis on the potential for recurrent episodes, asymptomatic viral shedding, and sexual transmission.
- Patients should be advised to abstain from sexual activity when lesions or prodromal symptoms are present and encouraged to inform their sex partners that they have genital herpes. The use of condoms during all sexual exposures with new or uninfected sex partners should be encouraged.
- Sexual transmission of HSV can occur during asymptomatic periods. Asymptomatic viral shedding occurs more frequently in patients who have genital HSV-2 infection than HSV-1 infection and in patients who have had genital herpes for <12 months. Such patients should be counseled to prevent spread of the infection.

- The risk for neonatal infection should be explained to all patients, including men. Childbearing-aged women who have genital herpes should be advised to inform health-care providers who care for them during pregnancy about the HSV infection.
- Patients having a first episode of genital herpes should be advised that a) episodic antiviral therapy during recurrent episodes might shorten the duration of lesions and b) suppressive antiviral therapy can ameliorate or prevent recurrent outbreaks.

Recurrent Episodes of HSV Disease

Most patients with first-episode genital HSV-2 infection will have recurrent episodes of genital lesions. Episodic or suppressive antiviral therapy might shorten the duration of lesions or ameliorate recurrences. Because many patients benefit from antiviral therapy, options for treatment should be discussed with all patients.

When treatment is started during the prodrome or within 1 day after onset of lesions, many patients who have recurrent disease benefit from episodic therapy. If episodic treatment of recurrences is chosen, the patient should be provided with antiviral therapy, or a prescription for the medication, so that treatment can be initiated at the first sign of prodrome or genital lesions.

Daily suppressive therapy reduces the frequency of genital herpes recurrences by ≥75% among patients who have frequent recurrences (i.e., six or more recurrences per year). Safety and efficacy have been documented among patients receiving daily therapy with acyclovir for as long as 6 years, and with valacyclovir and famciclovir for 1 year. Suppressive therapy has not been associated with emergence of clinically significant acyclovir resistance among immunocompetent patients. After 1 year of continuous suppressive therapy, discontinuation of therapy should be discussed with the patient to assess the patient's psychological adjustment to genital herpes and rate of recurrent episodes, as the frequency of recurrences decreases over time in many patients. Insufficient experience with famciclovir and valacyclovir prevents recommendation of these drugs for >1 year.

Suppressive treatment with acyclovir reduces but does not eliminate asymptomatic viral shedding. Therefore, the extent to which suppressive therapy may prevent HSV transmission is unknown.

Recommended Regimens for Episodic Recurrent Infection

Acyclovir 400 mg orally three times a day for 5 days,
OR
Acyclovir 200 mg orally five times a day for 5 days,
OR
Acyclovir 800 mg orally twice a day for 5 days,
OR
Famciclovir 125 mg orally twice a day for 5 days,
OR
Valacyclovir 500 mg orally twice a day for 5 days.

Recommended Regimens for Daily Suppressive Therapy

Acyclovir 400 mg orally twice a day,
OR
Famciclovir 250 mg orally twice a day,
OR
Valacyclovir 500 mg orally once a day,
OR
Valacyclovir 1,000 mg orally once a day.

Valacyclovir 500 mg once a day appears less effective than other valacyclovir dosing regimens in patients who have very frequent recurrences (i.e., ≥10 episodes per year). Few comparative studies of valacyclovir and famciclovir with acyclovir have been conducted. The results of these studies suggest that valacyclovir and famciclovir are comparable to acyclovir in clinical outcome. However, valacyclovir and famciclovir may provide increased ease in administration, which is an important consideration for prolonged treatment.

Severe Disease

IV therapy should be provided for patients who have severe disease or complications necessitating hospitalization, such as disseminated infection, pneumonitis, hepatitis, or complications of the central nervous system (e.g., meningitis or encephalitis).

Recommended Regimen
Acyclovir 5–10 mg/kg body weight IV every 8 hours for 5–7 days or until clinical resolution is attained.

Management of Sex Partners

The sex partners of patients who have genital herpes are likely to benefit from evaluation and counseling. Symptomatic sex partners should be evaluated and treated in the same manner as patients who have genital lesions. However, most persons who have genital HSV infection do not have a history of typical genital lesions. These persons and their future sex partners may benefit from evaluation and counseling. Thus, even asymptomatic sex partners of patients who have newly diagnosed genital herpes should be questioned concerning histories of typical and atypical genital lesions, and they should be encouraged to examine themselves for lesions in the future and seek medical attention promptly if lesions appear.

Most of the available HSV antibody tests do not accurately discriminate between HSV-1 and HSV-2 antibodies, and their use is not currently recommended. Sensitive and type-specific serum antibody assays may become commercially available and contribute to future intervention strategies.

Special Considerations

Allergy, Intolerance, or Adverse Reactions
Allergic and other adverse reactions to acyclovir, valacyclovir, and famciclovir are infrequent. Desensitization to acyclovir has been described previously (23).

HIV Infection
Immunocompromised patients might have prolonged and/or severe episodes of genital or perianal herpes. Lesions caused by HSV are relatively common among HIV-infected patients and may be severe, painful, and atypical. Intermittent or suppressive therapy with oral antiviral agents is often beneficial.

The dosage of antiviral drugs for HIV-infected patients is controversial, but clinical experience strongly suggests that immunocompromised patients benefit from increased doses of antiviral drugs. Regimens such as acyclovir 400 mg orally three to five times a day, as used for other immunocompromised patients, have been useful. Therapy should be continued until clinical resolution is attained. Famciclovir 500 mg twice a day has been effective in decreasing both the rate of recurrences and the rate of subclinical shedding among HIV-infected patients. In immunocompromised patients, valacyclovir in doses of 8 g per day has been associated with a syndrome resembling either hemolytic uremic syndrome or thrombotic thrombocytopenic purpura. However, in the doses recommended for treatment of genital herpes, valacyclovir, acyclovir, and famciclovir probably are safe for use in immunocompromised patients. For severe cases, acyclovir 5 mg/kg IV every 8 hours may be required.

If lesions persist in a patient receiving acyclovir treatment, resistance of the HSV strain to acyclovir should be suspected. Such patients should be managed in consultation with an expert. For severe cases caused by proven or suspected acyclovir-resistant strains, alternate therapy should be administered. All acyclovir-resistant strains are resistant to valacyclovir, and most are resistant to famciclovir. Foscarnet, 40 mg/kg body weight IV every 8 hours until clinical resolution is attained, is often effective for treatment of acyclovir-resistant genital herpes. Topical cidofovir gel 1% applied to the lesions once daily for 5 consecutive days also might be effective.

Pregnancy
The safety of systemic acyclovir and valacyclovir therapy in pregnant women has not been established. Glaxo-Wellcome, Inc., in cooperation with CDC, maintains a registry to assess the use and effects of acyclovir and valacyclovir during pregnancy. Women who receive acyclovir or valacyclovir during pregnancy should be reported to this registry; telephone (800) 722-9292, extension 38465.

Current registry findings do not indicate an increased risk for major birth defects after acyclovir treatment (i.e., in comparison with the general population). These findings provide some assurance in counseling women who have had prenatal exposure to acyclovir. The accumulated case histories represent an insufficient sample for reaching reliable and definitive conclusions regarding the risks associated with acyclovir treatment during pregnancy. Prenatal exposure to valacyclovir and famciclovir is too limited to provide useful information on pregnancy outcomes.

The first clinical episode of genital herpes during pregnancy may be treated with oral acyclovir. In the presence of life-threatening maternal HSV infection (e.g., disseminated infection, encephalitis, pneumonitis, or hepatitis), acyclovir administered IV is indicated. Investigations of acyclovir use among pregnant women suggest that acyclovir treatment near term might reduce the rate of abdominal deliveries among women who have frequently recurring or newly acquired genital herpes by decreasing the incidence of active lesions. However, routine administration of acyclovir to pregnant women who have a history of recurrent genital herpes is not recommended at this time.

Perinatal Infection

Most mothers of infants who acquire neonatal herpes lack histories of clinically evident genital herpes. The risk for transmission to the neonate from an infected mother is high among women who acquire genital herpes near the time of delivery (30%–50%) and is low among women who have a history of recurrent herpes at term and women who acquire genital HSV during the first half of pregnancy (3%). Therefore, prevention of neonatal herpes should emphasize prevention of acquisition of genital HSV infection during late pregnancy. Susceptible women whose partners have oral or genital HSV infection, or those whose sex partners' infection status is unknown, should be counseled to avoid unprotected genital and oral sexual contact during late pregnancy. The results of viral cultures during pregnancy do not predict viral shedding at the time of delivery, and such cultures are not indicated routinely.

At the onset of labor, all women should be examined and carefully questioned regarding whether they have symptoms of genital herpes. Infants of women who do not have symptoms or signs of genital herpes infection or its prodrome may be delivered vaginally. Abdominal delivery does not completely eliminate the risk for HSV infection in the neonate.

Infants exposed to HSV during birth, as proven by virus isolation or presumed by observation of lesions, should be followed carefully. Some authorities recommend that such infants undergo surveillance cultures of mucosal surfaces to detect HSV infection before development of clinical signs. Available data do not support the routine use of acyclovir for asymptomatic infants exposed during birth through an infected birth canal, because the risk for infection in most infants is low. However, infants born to women who acquired genital herpes near term are at high risk for neonatal herpes, and some experts recommend acyclovir therapy for these infants. Such pregnancies and newborns should be managed in consultation with an expert. All infants who have evidence of neonatal herpes should be promptly evaluated and treated with systemic acyclovir (19). Acyclovir 30–60 mg/kg/day for 10–21 days is the regimen of choice.

LYMPHOGRANULOMA VENEREUM

Lymphogranuloma venereum (LGV), a rare disease in the United States, is caused by the invasive serovars L1, L2, or L3 of *C. trachomatis*. The most frequent clinical manifestation of LGV among heterosexual men is tender inguinal and/or femoral lymphadenopathy that is usually unilateral. Women and homosexually active men might have proctocolitis or inflammatory involvement of perirectal or perianal lymphatic tissues that can result in fistulas and strictures. When most patients seek medical care, they no longer have the self-limited genital ulcer that sometimes occurs at the inoculation site. The diagnosis usually is made serologically and by exclusion of other causes of inguinal lymphadenopathy or genital ulcers.

Treatment

Treatment cures infection and prevents ongoing tissue damage, although tissue reaction can result in scarring. Buboes may require aspiration through intact skin or incision and drainage to prevent the formation of inguinal/femoral ulcerations. Doxycycline is the preferred treatment.

Recommended Regimen

Doxycycline 100 mg orally twice a day for 21 days.

Alternative Regimen

Erythromycin base 500 mg orally four times a day for 21 days.

The activity of azithromycin against *C. trachomatis* suggests that it may be effective in multiple doses over 2–3 weeks, but clinical data regarding its use are lacking.

Follow-Up

Patients should be followed clinically until signs and symptoms have resolved.

Management of Sex Partners

Sex partners of patients who have LGV should be examined, tested for urethral or cervical chlamydial infection, and treated if they had sexual contact with the patient during the 30 days preceding onset of symptoms in the patient.

Special Considerations

Pregnancy
Pregnant women should be treated with the erythromycin regimen.

HIV Infection
HIV-infected persons who have LGV should be treated according to the regimens cited previously. Anecdotal evidence suggests that LGV infection in HIV-positive patients may require prolonged therapy and that resolution might be delayed.

SYPHILIS

General Principles

Background

Syphilis is a systemic disease caused by *T. pallidum*. Patients who have syphilis may seek treatment for signs or symptoms of primary infection (i.e., ulcer or chancre at the infection site), secondary infection (i.e., manifestations that include rash, mucocutaneous lesions, and adenopathy), or tertiary infection (i.e., cardiac, neurologic, ophthalmic, auditory, or gummatous lesions). Infections also may be detected by serologic testing during the latent stage. Latent syphilis acquired within the preceding year is referred to as early latent syphilis; all other cases of latent syphilis are either late latent syphilis or syphilis of unknown duration. Treatment for late latent syphilis, as well as tertiary syphilis, theoretically may require a longer duration of therapy because organisms are dividing more slowly; however, the validity and importance of this concept have not been determined.

Diagnostic Considerations and Use of Serologic Tests

Darkfield examinations and direct fluorescent antibody tests of lesion exudate or tissue are the definitive methods for diagnosing early syphilis. A presumptive diagnosis is possible with the use of two types of serologic tests for syphilis: a) nontreponemal (e.g., Venereal Disease Research Laboratory [VDRL] and RPR) and b) treponemal (e.g., fluorescent treponemal antibody absorbed [FTA-ABS] and microhemagglutination assay for antibody to *T. pallidum* [MHA-TP]). The use of only one type of test is insufficient for diagnosis because false-positive nontreponemal test results occasionally occur secondary to various medical conditions. Nontreponemal test antibody titers usually correlate with disease activity, and results should be reported quantitatively. A fourfold change in titer, equivalent to a change of two dilutions (e.g., from 1:16 to 1:4 or from 1:8 to 1:32), usually is considered necessary to demonstrate a clinically significant difference between two nontreponemal test results that were obtained by using the same serologic test. It is expected that the nontreponemal test will eventually become nonreactive after treatment; however, in some patients, nontreponemal antibodies can persist at a low titer for a long period, sometimes for the remainder of their lives. This response is referred to as the serofast reaction. Most patients who have reactive treponemal tests will have reactive tests for the remainder of their lives, regardless of treatment or disease activity. However, 15%–25% of patients treated during the primary stage might revert to being serologically nonreactive after 2–3 years. Treponemal test antibody titers correlate poorly with disease activity and should not be used to assess treatment response.

Sequential serologic tests should be performed by using the same testing method (e.g., VDRL or RPR), preferably by the same laboratory. The VDRL and RPR are equally valid, but quantitative results from the two tests cannot be compared directly because RPR titers often are slightly higher than VDRL titers.

HIV-infected patients can have abnormal serologic test results (i.e., unusually high, unusually low, and fluctuating titers). For such patients with clinical syndromes suggestive of early syphilis, use of other tests (e.g., biopsy and direct microscopy) should be considered. However, for most HIV-infected patients, serologic tests appear to be accurate and reliable for the diagnosis of syphilis and for evaluation of treatment response.

No single test can be used to diagnose all cases of neurosyphilis. The diagnosis of neurosyphilis can be made based on various combinations of reactive serologic test results, abnormalities of cerebrospinal fluid (CSF) cell count or protein, or a reactive VDRL-CSF with or without clinical manifestations. The CSF leukocyte count usually is elevated (>5 WBCs/mm^3) when neurosyphilis is present, and it also is a sensitive measure of the effectiveness of therapy. The VDRL-CSF is the standard serologic test for CSF; when reactive in the absence of substantial contamination of CSF with blood, it is considered diagnostic of neurosyphilis. However, the VDRL-CSF may be nonreactive when neurosyphilis is present. Some experts recommend performing an FTA-ABS test on CSF. The CSF FTA-ABS is less specific (i.e., yields more false-positive results) for neurosyphilis than the VDRL-CSF. However, the test is believed to be highly sensitive, and some experts believe that a negative CSF FTA-ABS test excludes neurosyphilis.

Treatment

Parenteral penicillin G is the preferred drug for treatment of all stages of syphilis. The preparation(s) used (i.e., benzathine, aqueous procaine, or aqueous crystalline), the dosage, and the length of treatment depend on the stage and clinical manifestations of disease.

The efficacy of penicillin for the treatment of syphilis was well established through clinical experience before the value of randomized controlled clinical trials was recognized. Therefore, almost all the recommendations for the treatment of syphilis are based on expert opinion reinforced by case series, clinical trials, and 50 years of clinical experience.

Parenteral penicillin G is the only therapy with documented efficacy for neurosyphilis or for syphilis during pregnancy. Patients who report a penicillin allergy, including pregnant women with syphilis in any stage and patients with neurosyphilis, should be desensitized and treated with penicillin. Skin testing for penicillin allergy may be useful in some settings (see Management of Patients Who Have a History of Penicillin Allergy), because the minor determinants needed for penicillin skin testing are unavailable commercially.

The Jarisch-Herxheimer reaction is an acute febrile reaction—often accompanied by headache, myalgia, and other symptoms—that might occur within the first 24 hours after any therapy for syphilis; patients should be advised of this possible adverse reaction. The Jarisch-Herxheimer reaction often occurs among patients who have early syphilis. Antipyretics may be recommended, but no proven methods prevent this reaction. The Jarisch-Herxheimer reaction may induce early labor or cause fetal distress among pregnant women. This concern should not prevent or delay therapy (see Syphilis During Pregnancy).

Management of Sex Partners

Sexual transmission of *T. pallidum* occurs only when mucocutaneous syphilitic lesions are present; such manifestations are uncommon after the first year of infection. However, persons exposed sexually to a patient who has syphilis in any stage should be evaluated clinically and serologically according to the following recommendations:

- Persons who were exposed within the 90 days preceding the diagnosis of primary, secondary, or early latent syphilis in a sex partner might be infected even if seronegative; therefore, such persons should be treated presumptively.
- Persons who were exposed >90 days before the diagnosis of primary, secondary, or early latent syphilis in a sex partner should be treated presumptively if serologic test results are not available immediately and the opportunity for follow-up is uncertain.
- For purposes of partner notification and presumptive treatment of exposed sex partners, patients with syphilis of unknown duration who have high nontreponemal serologic test titers (i.e., ≥1:32) may be considered as having early syphilis. However, serologic titers should not be used to differentiate early from late latent syphilis for the purpose of determining treatment (see section regarding treatment of latent syphilis).
- Long-term sex partners of patients who have late syphilis should be evaluated clinically and serologically for syphilis and treated on the basis of the findings of the evaluation.

The time periods before treatment used for identifying at-risk sex partners are a) 3 months plus duration of symptoms for primary syphilis, b) 6 months plus duration of symptoms for secondary syphilis, and c) 1 year for early latent syphilis.

Primary and Secondary Syphilis

Treatment

Parenteral penicillin G has been used effectively for four decades to achieve a local cure (i.e., healing of lesions and prevention of sexual transmission) and to prevent late sequelae. However, no adequately conducted comparative trials have been performed to guide the selection of an optimal penicillin regimen (i.e., the dose, duration, and preparation). Substantially fewer data are available concerning nonpenicillin regimens.

Recommended Regimen for Adults
Patients who have primary or secondary syphilis should be treated with the following regimen:
Benzathine penicillin G 2.4 million units IM in a single dose.

NOTE: Recommendations for treating pregnant women and HIV-infected patients for syphilis are discussed in separate sections.

Recommended Regimen for Children
After the newborn period, children in whom syphilis is diagnosed should have a CSF examination to detect asymptomatic neurosyphilis, and birth and maternal medical records should be reviewed to assess whether the child has congenital or acquired syphilis (see Congenital Syphilis). Children with acquired primary or secondary syphilis should be evaluated (including consultation with child-protection services) and treated by using the following pediatric regimen (see Sexual Assault or Abuse of Children).
Benzathine penicillin G 50,000 units/kg IM, up to the adult dose of 2.4 million units in a single dose.

Other Management Considerations

All patients who have syphilis should be tested for HIV infection. In geographic areas in which the prevalence of HIV is high, patients who have primary syphilis should be retested for HIV after 3 months if the first HIV test result was negative. This recommendation will become particularly important if it can be demonstrated that intensive antiviral therapy administered soon after HIV seroconversion is beneficial.

Patients who have syphilis and who also have symptoms or signs suggesting neurologic disease (e.g., meningitis) or ophthalmic disease (e.g., uveitis) should be evaluated fully for neurosyphilis and syphilitic eye disease; this evaluation should include CSF analysis and ocular slit-lamp examination. Such patients should be treated appropriately according to the results of this evaluation.

Invasion of CSF by *T. pallidum* accompanied by CSF abnormalities is common among adults who have primary or secondary syphilis. However, neurosyphilis develops in only a few patients after treatment with the regimens described in this report. Therefore, unless clinical signs or symptoms of neurologic or ophthalmic involvement are present, lumbar puncture is not recommended for routine evaluation of patients who have primary or secondary syphilis.

Follow-Up

Treatment failures can occur with any regimen. However, assessing response to treatment often is difficult, and no definitive criteria for cure or failure have been established. Serologic test titers may decline more slowly for patients who previously had syphilis. Patients should be reexamined clinically and serologically at both 6 months and 12 months; more frequent evaluation may be prudent if follow-up is uncertain.

Patients who have signs or symptoms that persist or recur or who have a sustained fourfold increase in nontreponemal test titer (i.e., in comparison with either the baseline titer or a subsequent result) probably failed treatment or were reinfected. These patients should be retreated after reevaluation for HIV infection. Unless reinfection with *T. pallidum* is certain, a lumbar puncture also should be performed.

Failure of nontreponemal test titers to decline fourfold within 6 months after therapy for primary or secondary syphilis identifies persons at risk for treatment failure. Such persons should be reevaluated for HIV infection. Optimal management of such patients is unclear. At a minimum, these patients should have additional clinical and serologic follow-up. HIV-infected patients should be evaluated more frequently (i.e., at 3-month intervals instead of 6-month intervals). If additional follow-up cannot be ensured, re-treatment is recommended. Some experts recommend CSF examination in such situations.

When patients are retreated, most experts recommend re-treatment with three weekly injections of benzathine penicillin G 2.4 million units IM, unless CSF examination indicates that neurosyphilis is present.

Management of Sex Partners

Refer to General Principles, Management of Sex Partners.

Special Considerations

Penicillin Allergy
Nonpregnant penicillin-allergic patients who have primary or secondary syphilis should be treated with one of the following regimens. Close follow-up of such patients is essential.

Recommended Regimens

Doxycycline 100 mg orally twice a day for 2 weeks,

OR

Tetracycline 500 mg orally four times a day for 2 weeks.

There is less clinical experience with doxycycline than with tetracycline, but compliance is likely to be better with doxycycline. Therapy for a patient who cannot tolerate either doxycycline or tetracycline should depend on whether the patient's compliance with the therapy regimen and with follow-up examinations can be ensured.

Pharmacologic and bacteriologic considerations suggest that ceftriaxone should be effective, but data concerning ceftriaxone are limited and clinical experience is insufficient to enable identification of late failures. The optimal dose and duration have not been established for ceftriaxone, but a suggested daily regimen of 1 g may be considered if treponemacidal levels in the blood can be maintained for 8–10 days. Single-dose ceftriaxone therapy is not effective for treating syphilis.

For nonpregnant patients whose compliance with therapy and follow-up can be ensured, an alternative regimen is erythromycin 500 mg orally four times a day for 2 weeks. However, erythromycin is less effective than the other recommended regimens.

Patients whose compliance with therapy or follow-up cannot be ensured should be desensitized and treated with penicillin. Skin testing for penicillin allergy may be useful in some circumstances in which the reagents and expertise to perform the test adequately are available (see Management of Patients Who Have a History of Penicillin Allergy).

Pregnancy
Pregnant patients who are allergic to penicillin should be desensitized, if necessary, and treated with penicillin (see Management of Patients Who Have a History of Penicillin Allergy and Syphilis During Pregnancy).

HIV Infection
Refer to Syphilis in HIV-Infected Persons.

Latent Syphilis

Latent syphilis is defined as those periods after infection with *T. pallidum* when patients are seroreactive, but demonstrate no other evidence of disease. Patients who have latent syphilis and who acquired syphilis within the preceding year are classified as having early latent syphilis. Patients can be demonstrated as having early latent syphilis if, within the year preceding the evaluation, they had a) a documented seroconversion, b) unequivocal symptoms of primary or secondary syphilis, or c) a sex partner who had primary, secondary, or early latent syphilis. Almost all other patients have latent syphilis of unknown duration and should be managed as if they had late latent syphilis.

Nontreponemal serologic titers usually are higher during early latent syphilis than late latent syphilis. However, early latent syphilis cannot be reliably distinguished from late latent syphilis solely on the basis of nontreponemal titers. Regardless of the level of the nontreponemal titers, patients in whom the illness does not meet the definition of early syphilis should be treated as if they have late latent infection. All sexually active women with reactive nontreponemal serologic tests should have a pelvic examination before syphilis staging is completed to evaluate for internal mucosal lesions. All patients who have syphilis should be tested for HIV infection.

Treatment

Treatment of latent syphilis is intended to prevent occurrence or progression of late complications. Although clinical experience supports the effectiveness of penicillin in achieving these goals, limited evidence is available for guidance in choosing specific regimens. There is minimal evidence to support the use of nonpenicillin regimens.

Recommended Regimens for Adults

The following regimens are recommended for nonallergic patients who have normal CSF examinations (if performed):

Early Latent Syphilis:

Benzathine penicillin G 2.4 million units IM in a single dose.

Late Latent Syphilis or Latent Syphilis of Unknown Duration:

Benzathine penicillin G 7.2 million units total, administered as three doses of 2.4 million units IM each at 1-week intervals.

Recommended Regimens for Children

After the newborn period, children in whom syphilis is diagnosed should have a CSF examination to exclude neurosyphilis, and birth and maternal medical records should be reviewed to assess whether the child has congenital or acquired syphilis (see Congenital Syphilis). Older children with acquired latent syphilis should be evaluated as described for adults and treated using the following pediatric regimens (see Sexual Assault or Abuse of Children). These regimens are for nonallergic children who have acquired syphilis and whose results of the CSF examination were normal.

Early Latent Syphilis:

Benzathine penicillin G 50,000 units/kg IM, up to the adult dose of 2.4 million units in a single dose.

Late Latent Syphilis or Latent Syphilis of Unknown Duration:

Benzathine penicillin G 50,000 units/kg IM, up to the adult dose of 2.4 million units, administered as three doses at 1-week intervals (total 150,000 units/kg up to the adult total dose of 7.2 million units).

Other Management Considerations

All patients who have latent syphilis should be evaluated clinically for evidence of tertiary disease (e.g., aortitis, neurosyphilis, gumma, and iritis). Patients who have syphilis and who demonstrate any of the following criteria should have a prompt CSF examination:

- Neurologic or ophthalmic signs or symptoms;
- Evidence of active tertiary syphilis (e.g., aortitis, gumma, and iritis);
- Treatment failure; and
- HIV infection with late latent syphilis or syphilis of unknown duration.

If dictated by circumstances and patient preferences, a CSF examination may be performed for patients who do not meet these criteria. If a CSF examination is performed and the results indicate abnormalities consistent with neurosyphilis, the patient should be treated for neurosyphilis (see Neurosyphilis).

Follow-Up

Quantitative nontreponemal serologic tests should be repeated at 6, 12, and 24 months. Limited data are available to guide evaluation of the treatment response for patients who have latent syphilis. Patients should be evaluated for neurosyphilis and retreated appropriately if a) titers increase fourfold, b) an initially high titer (≥1:32) fails to decline at least fourfold (i.e., two dilutions) within 12–24 months, or c) signs or symptoms attributable to syphilis develop in the patient.

Management of Sex Partners

Refer to General Principles, Management of Sex Partners.

Special Considerations

Penicillin Allergy
Nonpregnant patients who have latent syphilis and who are allergic to penicillin should be treated with one of the following regimens.

Recommended Regimens

Doxycycline 100 mg orally twice a day,

OR

Tetracycline 500 mg orally four times a day.

Both drugs should be administered for 2 weeks if the duration of infection is known to have been <1 year; otherwise, they should be administered for 4 weeks.

Pregnancy
Pregnant patients who are allergic to penicillin should be desensitized and treated with penicillin (see Management of Patients Who Have a History of Penicillin Allergy and Syphilis During Pregnancy).

HIV Infection
Refer to Syphilis in HIV-Infected Persons.

Tertiary Syphilis

Tertiary syphilis refers to gumma and cardiovascular syphilis, but not to neurosyphilis. Nonallergic patients without evidence of neurosyphilis should be treated with the following regimen.

Recommended Regimen

Benzathine penicillin G 7.2 million units total, administered as three doses of 2.4 million units IM at 1-week intervals.

Other Management Considerations

Patients who have symptomatic late syphilis should have a CSF examination before therapy is initiated. Some experts treat all patients who have cardiovascular syphilis with a neurosyphilis regimen. The complete management of patients who have cardiovascular or gummatous syphilis is beyond the scope of these guidelines. These patients should be managed in consultation with an expert.

Follow-Up

Information is lacking with regard to follow-up of patients who have late syphilis. The clinical response depends partially on the nature of the lesions.

Management of Sex Partners

Refer to General Principles, Management of Sex Partners.

Special Considerations

Penicillin Allergy
Patients allergic to penicillin should be treated according to the recommended regimens for late latent syphilis.

Pregnancy
Pregnant patients who are allergic to penicillin should be desensitized, if necessary, and treated with penicillin (see Management of Patients Who Have a History of Penicillin Allergy and Syphilis During Pregnancy).

HIV Infection
Refer to Syphilis in HIV-Infected Persons.

Neurosyphilis

Treatment

Central nervous system disease can occur during any stage of syphilis. A patient who has clinical evidence of neurologic involvement with syphilis (e.g., ophthalmic or auditory symptoms, cranial nerve palsies, and symptoms or signs of meningitis) should have a CSF examination.

Syphilitic uveitis or other ocular manifestations frequently are associated with neurosyphilis; patients with these symptoms should be treated according to the recommendations for neurosyphilis. A CSF examination should be performed for all such patients to identify those with abnormalities who should have follow-up CSF examinations to assess treatment response.

Patients who have neurosyphilis or syphilitic eye disease (e.g., uveitis, neuroretinitis, or optic neuritis) and who are not allergic to penicillin should be treated with the following regimen:

Recommended Regimen
Aqueous crystalline penicillin G 18–24 million units a day, administered as 3–4 million units IV every 4 hours for 10–14 days.

If compliance with therapy can be ensured, patients may be treated with the following alternative regimen:

Alternative Regimen
Procaine penicillin 2.4 million units IM a day, PLUS **Probenecid** 500 mg orally four times a day, both for 10–14 days.

The durations of the recommended and alternative regimens for neurosyphilis are shorter than that of the regimen used for late syphilis in the absence of neurosyphilis. Therefore, some experts administer benzathine penicillin, 2.4 million units IM, after completion of these neurosyphilis treatment regimens to provide a comparable total duration of therapy.

Other Management Considerations

Other considerations in the management of patients who have neurosyphilis are as follows:

- All patients who have syphilis should be tested for HIV.
- Many experts recommend treating patients who have evidence of auditory disease caused by syphilis in the same manner as for neurosyphilis, regardless of the findings on CSF examination. Although systemic steroids are used frequently as adjunctive therapy for otologic syphilis, such drugs have not been proven beneficial.

Follow-Up

If CSF pleocytosis was present initially, a CSF examination should be repeated every 6 months until the cell count is normal. Follow-up CSF examinations also can be used to evaluate changes in the VDRL-CSF or CSF protein after therapy; however, changes in these two parameters are slower, and persistent abnormalities are of less importance. If the cell count has not decreased after 6 months, or if the CSF is not entirely normal after 2 years, re-treatment should be considered.

Management of Sex Partners

Refer to General Principles, Management of Sex Partners.

Special Considerations

Penicillin Allergy
Data have not been collected systematically for evaluation of therapeutic alternatives to penicillin for treatment of neurosyphilis. Patients who report being allergic to penicillin should either be densensitized to penicillin or be managed

in consultation with an expert. In some situations, skin testing to confirm penicillin allergy may be useful (see Management of Patients Who Have a History of Penicillin Allergy).

Pregnancy
Pregnant patients who are allergic to penicillin should be desensitized, if necessary, and treated with penicillin (see Syphilis During Pregnancy).

HIV Infection
Refer to Syphilis in HIV-Infected Persons.

Syphilis in HIV-Infected Persons

Diagnostic Considerations

Unusual serologic responses have been observed among HIV-infected persons who have syphilis. Most reports involved serologic titers that were higher than expected, but false-negative serologic test results or delayed appearance of seroreactivity also have been reported. Nevertheless, both treponemal and non-treponemal serologic tests for syphilis can be interpreted in the usual manner for most patients who are coinfected with *T. pallidum* and HIV.

When clinical findings suggest that syphilis is present, but serologic tests are nonreactive or unclear, alternative tests (e.g., biopsy of a lesion, darkfield examination, or direct fluorescent antibody staining of lesion material) may be useful.

Neurosyphilis should be considered in the differential diagnosis of neurologic disease in HIV-infected persons.

Treatment

In comparison with HIV-negative patients, HIV-infected patients who have early syphilis may be at increased risk for neurologic complications and may have higher rates of treatment failure with currently recommended regimens. The magnitude of these risks, although not defined precisely, is probably minimal. No treatment regimens for syphilis are demonstrably more effective in preventing neurosyphilis in HIV-infected patients than the syphilis regimens recommended for HIV-negative patients. Careful follow-up after therapy is essential.

Primary and Secondary Syphilis in HIV-Infected Persons

Treatment

Treatment with benzathine penicillin G, 2.4 million units IM, as for HIV-negative patients, is recommended. Some experts recommend additional treatments (e.g., three weekly doses of benzathine penicillin G as suggested for late syphilis) or other supplemental antibiotics in addition to benzathine penicillin G 2.4 million units IM.

Other Management Considerations

CSF abnormalities often occur among both asymptomatic HIV-infected patients in the absence of syphilis and HIV-negative patients who have primary or secondary syphilis. Such abnormalities in HIV-infected patients who have primary or secondary syphilis are of unknown prognostic significance. Most HIV-infected patients respond appropriately to the currently recommended penicillin therapy; however, some experts recommend CSF examination before therapy and modification of treatment accordingly.

Follow-Up

It is important that HIV-infected patients be evaluated clinically and serologically for treatment failure at 3, 6, 9, 12, and 24 months after therapy. Although of unproven benefit, some experts recommend a CSF examination after therapy (i.e., at 6 months).

HIV-infected patients who meet the criteria for treatment failure should be managed the same as HIV-negative patients (i.e., a CSF examination and re-treatment). CSF examination and re-treatment also should be strongly considered for patients whose nontreponemal test titer does not decrease fourfold within 6–12 months. Most experts would retreat

patients with 7.2 million units of benzathine penicillin G (administered as three weekly doses of 2.4 million units each) if CSF examinations are normal.

Special Considerations

Penicillin Allergy
Penicillin-allergic patients who have primary or secondary syphilis and HIV infection should be managed according to the recommendations for penicillin-allergic HIV-negative patients.

Latent Syphilis in HIV-Infected Persons

Diagnostic Considerations

HIV-infected patients who have early latent syphilis should be managed and treated according to the recommendations for HIV-negative patients who have primary and secondary syphilis.

HIV-infected patients who have either late latent syphilis or syphilis of unknown duration should have a CSF examination before treatment.

Treatment

A patient with late latent syphilis or syphilis of unknown duration and a normal CSF examination can be treated with 7.2 million units of benzathine penicillin G (as three weekly doses of 2.4 million units each). Patients who have CSF consistent with neurosyphilis should be treated and managed as described for neurosyphilis (see Neurosyphilis).

Follow-Up

Patients should be evaluated clinically and serologically at 6, 12, 18, and 24 months after therapy. If, at any time, clinical symptoms develop or nontreponemal titers rise fourfold, a repeat CSF examination should be performed and treatment administered accordingly. If between 12 and 24 months the nontreponemal titer fails to decline fourfold, the CSF examination should be repeated, and treatment administered accordingly.

Special Considerations

Penicillin Allergy
Penicillin regimens should be used to treat all stages of syphilis in HIV-infected patients. Skin testing to confirm penicillin allergy may be used (see Management of Patients Who Have a History of Penicillin Allergy). Patients may be desensitized, then treated with penicillin.

Syphilis During Pregnancy

All women should be screened serologically for syphilis during the early stages of pregnancy. In populations in which utilization of prenatal care is not optimal, RPR-card test screening and treatment (i.e., if the RPR-card test is reactive) should be performed at the time a pregnancy is diagnosed. For communities and populations in which the prevalence of syphilis is high or for patients at high risk, serologic testing should be performed twice during the third trimester, at 28 weeks of gestation and at delivery. (Some states mandate screening at delivery for all women.) Any woman who delivers a stillborn infant after 20 weeks of gestation should be tested for syphilis. No infant should leave the hospital without the maternal serologic status having been determined at least once during pregnancy.

Diagnostic Considerations

Seropositive pregnant women should be considered infected unless an adequate treatment history is documented clearly in the medical records and sequential serologic antibody titers have declined.

Treatment

Penicillin is effective for preventing maternal transmission to the fetus and for treating fetal-established infection. Evidence is insufficient to determine whether the specific, recommended penicillin regimens are optimal.

Recommended Regimens

Treatment during pregnancy should be the penicillin regimen appropriate for the stage of syphilis.

Other Management Considerations

Some experts recommend additional therapy in some settings. A second dose of benzathine penicillin 2.4 million units IM may be administered 1 week after the initial dose for women who have primary, secondary, or early latent syphilis. Ultrasonographic signs of fetal syphilis (i.e., hepatomegaly and hydrops) indicate a greater risk for fetal treatment failure; such cases should be managed in consultation with obstetric specialists.

Women treated for syphilis during the second half of pregnancy are at risk for premature labor and/or fetal distress if the treatment precipitates the Jarisch-Herxheimer reaction. These women should be advised to seek obstetric attention after treatment if they notice any contractions or decrease in fetal movements. Stillbirth is a rare complication of treatment, but concern for this complication should not delay necessary treatment. All patients who have syphilis should be offered testing for HIV infection.

Follow-Up

Coordinated prenatal care and treatment follow-up are important, and syphilis case management may help facilitate prenatal enrollment. Serologic titers should be repeated in the third trimester and at delivery. Serologic titers may be checked monthly in women at high risk for reinfection or in geographic areas in which the prevalence of syphilis is high. The clinical and antibody response should be appropriate for the stage of disease. Most women will deliver before their serologic response to treatment can be assessed definitively.

Management of Sex Partners

Refer to General Principles, Management of Sex Partners.

Special Considerations

Penicillin Allergy

There are no proven alternatives to penicillin for treatment of syphilis during pregnancy. Pregnant women who have a history of penicillin allergy should be desensitized and treated with penicillin. Skin testing may be helpful (see Management of Patients Who Have a History of Penicillin Allergy).

Tetracycline and doxycycline usually are not used during pregnancy. Erythromycin should not be used, because it does not reliably cure an infected fetus. Data are insufficient to recommend azithromycin or ceftriaxone.

HIV Infection

Refer to Syphilis in HIV-Infected Persons.

CONGENITAL SYPHILIS

Effective prevention and detection of congenital syphilis depends on the identification of syphilis in pregnant women and, therefore, on the routine serologic screening of pregnant women at the time of the first prenatal visit. Serologic testing and a sexual history also should be obtained at 28 weeks of gestation and at delivery in communities and populations in which the risk for congenital syphilis is high. Moreover, as part of the management of pregnant women who have syphilis, information concerning treatment of sex partners should be obtained in order to assess possible maternal reinfection. All pregnant women who have syphilis should be tested for HIV infection.

Routine screening of newborn sera or umbilical cord blood is not recommended. Serologic testing of the mother's serum is preferred to testing infant serum, because the serologic tests performed on infant serum can be nonreactive if the mother's serologic test result is of low titer or if the mother was infected late in pregnancy. No infant should leave the hospital without the maternal serologic status having been documented at least once during pregnancy.

Evaluation and Treatment of Infants During the First Month of Life

Diagnostic Considerations

The diagnosis of congenital syphilis is complicated by the transplacental transfer of maternal nontreponemal and treponemal IgG antibodies to the fetus. This transfer of antibodies makes the interpretation of reactive serologic tests for syphilis in infants difficult. Treatment decisions often must be made based on a) identification of syphilis in the mother; b) adequacy of maternal treatment; c) presence of clinical, laboratory, or radiographic evidence of syphilis in the infant; and d) comparison of the infant's nontreponemal serologic test results with those of the mother.

Who Should Be Evaluated

All infants born to seroreactive mothers should be evaluated with a quantitative nontreponemal serologic test (RPR or VDRL) performed on infant serum (i.e., umbilical cord blood might be contaminated with maternal blood and might yield a false-positive result). A treponemal test (i.e., MHA-TP or FTA-ABS) of a newborn's serum is not necessary.

Evaluation

All infants born to women who have reactive serologic tests for syphilis should be examined thoroughly for evidence of congenital syphilis (e.g., nonimmune hydrops, jaundice, hepatosplenomegaly, rhinitis, skin rash, and/or pseudoparalysis of an extremity). Pathologic examination of the placenta or umbilical cord using specific fluorescent antitreponemal antibody staining is suggested. Darkfield microscopic examination or direct fluorescent antibody staining of suspicious lesions or body fluids (e.g., nasal discharge) also should be performed.

Further evaluation of the infant is dependent on a) whether any abnormalities are present on physical examination, b) maternal treatment history, c) stage of infection at the time of treatment, and d) comparison of maternal (at delivery) and infant nontreponemal titers utilizing the same test and preferably the same laboratory.

Treatment

Infants should be treated for presumed congenital syphilis if they were born to mothers who met any of the following criteria:

- Had untreated syphilis at delivery;*
- Had serologic evidence of relapse or reinfection after treatment (i.e., a fourfold or greater increase in nontreponemal antibody titer);
- Was treated with erythromycin or other nonpenicillin regimen for syphilis during pregnancy;**
- Was treated for syphilis ≤1 month before delivery;
- Did not have a well-documented history of treatment for syphilis;
- Was treated for early syphilis during pregnancy with the appropriate penicillin regimen, but nontreponemal antibody titers did not decrease at least fourfold; or
- Was treated appropriately before pregnancy but had insufficient serologic follow-up to ensure an adequate treatment response and lack of current infection (i.e., an appropriate response includes a] at least a fourfold decrease in nontreponemal antibody titers for patients treated for early syphilis and b] stable or declining nontreponemal titers of ≤1:4 for other patients).

  Regardless of a maternal history of infection with *T. pallidum* or treatment for syphilis, the evaluation should include the following tests if the infant has either

  a) an abnormal physical examination that is consistent with congenital syphilis,

  b) a serum quantitative nontreponemal serologic titer that is fourfold greater than the mother's titer, or

  c) a positive darkfield or fluorescent antibody test of body fluid(s).

- CSF analysis for VDRL, cell count, and protein;
- Complete blood count (CBC) and differential CBC and platelet count;
- Other tests as clinically indicated (e.g., long-bone radiographs, chest radiograph, liver-function tests, cranial ultrasound, ophthalmologic examination, and auditory brainstem response).

* A woman treated with a regimen other than those recommended in these guidelines for treatment of syphilis should be considered untreated.
** The absence of a fourfold greater titer for an infant does not exclude congenital syphilis.

Recommended Regimens

Aqueous crystalline penicillin G 100,000–150,000 units/kg/day, administered as 50,000 units/kg/dose IV every 12 hours during the first 7 days of life, and every 8 hours thereafter for a total of 10 days;

OR

Procaine penicillin G 50,000 units/kg/dose IM a day in a single dose for 10 days.

If >1 day of therapy is missed, the entire course should be restarted. Data are insufficient regarding the use of other antimicrobial agents (e.g., ampicillin). When possible, a full 10-day course of penicillin is preferred. The use of agents other than penicillin requires close serologic follow-up to assess adequacy of therapy.

In all other situations, the maternal history of infection with *T. pallidum* and treatment for syphilis must be considered when evaluating and treating the infant. For infants who have a normal physical examination and a serum quantitative non-treponemal serologic titer the same or less than fourfold the maternal titer, the evaluation depends on the maternal treatment history and stage of infection.

- The infant should receive the following treatment if a) the maternal treatment was not given, was undocumented, was a nonpenicillin regimen, or was administered ≤4 weeks before delivery; b) the adequacy of maternal treatment for early syphilis cannot be evaluated because the nontreponemal serologic titer has not decreased fourfold; or c) relapse or reinfection is suspected because of a fourfold increase in maternal nontreponemal serologic titer.
  a. Aqueous penicillin G or procaine penicillin G for 10 days. Some experts prefer this therapy if the mother has untreated early syphilis at delivery. A complete evaluation is unnecessary if 10 days of parenteral therapy is given. However such evaluation may be useful; a lumbar puncture may document CSF abnormalities that would prompt close follow-up.[†] Other tests (e.g., CBC and platelet count and bone radiographs) may be performed to further support a diagnosis of congenital syphilis; or
  b. Benzathine penicillin G 50,000 units/kg (single dose IM) if the infant's evaluation (i.e., CSF examination, long-bone radiographs, and CBC with platelets) is normal and follow-up is certain. If any part of the infant's evaluation is abnormal or not done, or the CSF analysis is uninterpretable secondary to contamination with blood, then a 10-day course of penicillin (see preceding paragraph) is required.[††]
- Evaluation is unnecessary if the maternal treatment a) was during pregnancy, appropriate for the stage of infection, and >4 weeks before delivery; b) was for early syphilis and the nontreponemal serologic titers decreased fourfold after appropriate therapy; or c) was for late latent infection, the nontreponemal titers remained stable and low, and there is no evidence of maternal reinfection or relapse. A single dose of benzathine penicillin G 50,000 units/kg IM should be administered. (Note: Some experts would not treat the infant but would provide close serologic follow-up.) Furthermore, in these situations, if the infant's non-treponemal test is nonreactive, no treatment is necessary.
- Evaluation and treatment are unnecessary if the maternal treatment was before pregnancy, after which the mother was evaluated multiple times, and the nontreponemal serologic titer remained low and stable before and during pregnancy and at delivery (VDRL ≤1:2; RPR ≤1:4). Some experts would treat with benzathine penicillin G 50,000 units/kg as a single IM injection, particularly if follow-up is uncertain.

Evaluation and Treatment of Older Infants and Children Who Have Congenital Syphilis

Children who are identified as having reactive serologic tests for syphilis after the neonatal period (i.e., at >1 month of age) should have maternal serology and records reviewed to assess whether the child has congenital or acquired syphilis (for acquired syphilis, see Primary and Secondary Syphilis and Latent Syphilis). If the child possibly has congenital syphilis, the child should be evaluated fully (i.e., a CSF examination for cell count, protein, and VDRL [abnormal CSF evaluation includes a reactive VDRL test, >5 WBCs/mm ^{3} , and/or protein >40 mg/dL]; an eye examination; and other tests such as long-bone radiographs, CBC, platelet count, and auditory brainstem response as indicated clinically). Any child who possibly has congenital syphilis or who has neurologic involvement should be treated with aqueous crystalline penicillin G, 200,000–300,000 units/kg/day IV (administered as 50,000 units/kg every 4–6 hours) for 10 days.

[†] CSF test results obtained during the neonatal period can be difficult to interpret; normal values differ by gestational age and are higher in preterm infants. Values as high as 25 white blood cells (WBCs)/mm^3 and/or protein of 150 mg/dL might occur among normal neonates; some experts, however, recommend that lower values (i.e., 5 WBCs/mm^3 and protein of 40 mg/dL) be considered the upper limits of normal. Other causes of elevated values also should be considered when an infant is being evaluated for congenital syphilis.

[††] If the infant's nontreponemal test is nonreactive and the likelihood of the infant being infected is low, some experts recommend no evaluation but treatment of the infant with a single IM dose of benzathine penicillin G 50,000 units/kg for possible incubating syphilis, after which the infant should have close serologic follow-up.

Follow-Up

All seroreactive infants (or an infant whose mother was seroreactive at delivery) should receive careful follow-up examinations and serologic testing (i.e., a nontreponemal test) every 2–3 months until the test becomes nonreactive or the titer has decreased fourfold. Nontreponemal antibody titers should decline by 3 months of age and should be nonreactive by 6 months of age if the infant was not infected (i.e., if the reactive test result was caused by passive transfer of maternal IgG antibody) or was infected but adequately treated. The serologic response after therapy may be slower for infants treated after the neonatal period. If these titers are stable or increasing after 6–12 months of age, the child should be evaluated, including a CSF examination, and treated with a 10-day course of parenteral penicillin G.

Treponemal tests should not be used to evaluate treatment response because the results for an infected child can remain positive despite effective therapy. Passively transferred maternal treponemal antibodies could be present in an infant until age 15 months. A reactive treponemal test after age 18 months is diagnostic of congenital syphilis. If the nontreponemal test is nonreactive at this time, no further evaluation or treatment is necessary. If the nontreponemal test is reactive at age 18 months, the infant should be fully (re)evaluated and treated for congenital syphilis.

Infants whose initial CSF evaluation is abnormal should undergo a repeat lumbar puncture approximately every 6 months until the results are normal. A reactive CSF VDRL test or abnormal CSF indices that cannot be attributed to other ongoing illness requires re-treatment for possible neurosyphilis.

Follow-up of children treated for congenital syphilis after the newborn period should be the same as that prescribed for congenital syphilis among neonates.

Special Considerations

Penicillin Allergy

Infants and children who require treatment for syphilis but who have a history of penicillin allergy or develop an allergic reaction presumed secondary to penicillin should be desensitized, if necessary, and treated with penicillin. Skin testing may be helpful in some patients and settings (see Management of Patients Who Have a History of Penicillin Allergy). Data are insufficient regarding the use of other antimicrobial agents (e.g., ceftriaxone); if a nonpenicillin agent is used, close serologic and CSF follow-up is indicated.

HIV Infection

Data are insufficient regarding whether infants who have congenital syphilis and whose mothers are coinfected with HIV require different evaluation, therapy, or follow-up for syphilis than is recommended for all infants.

Medical providers play a vital role in the prevention and control of sexually transmitted diseases (STDs). Providers can help significantly reduce the occurrence of these diseases by:

- Evaluating each patient, as appropriate, for evidence of STDs, and for evidence of high-risk sexual behaviors.
- Promptly diagnosing and treating patients with STDs according to current guidelines.
- Providing appropriate follow-up after patients have been treated.
- Providing education and counseling to patients engaging in high-risk sexual behaviors.
- Promptly reporting, as required by Missouri law, all cases of chlamydial infection, gonorrhea, syphilis, and hepatitis B to the local health department, or to the Missouri Department of Health (DOH) at (573) 751-6463. Reports of cases of HIV infection/AIDS should be made as follows:
  - Health care providers in St. Louis City and St. Louis County should report the individual to the St. Louis City Department of Health and Hospitals at (314) 658-1159.
  - Providers in the five-county Kansas City metropolitan area should report to the Kansas City Health Department at (816) 983-4200.
  - All other providers should report to DOH's Office of Surveillance at (573) 751-6463.

Updated Recommendations for Management of Occupational Exposure to HIV

The U.S. Public Health Service has updated its recommendations for the management of health-care workers who have occupational exposure to blood and other body fluids that may contain HIV. (CDC. Public Health Service guidelines for the management of health-care worker exposures to HIV and recommendations for postexposure prophylaxis. MMWR 1998; 47[No. RR-7].) These new guidelines are available on the World Wide Web at: http://www.cdc.gov/epo/mmwr/mmwr_rr.html.

Occupational exposures should be considered urgent medical concerns to ensure timely administration of post-exposure prophylaxis as appropriate. All physician's offices, clinics, hospitals, and other health care facilities should have written protocols in place for the management of such exposures.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Nov 97	Dec 97	Total YTD
Specimens Tested	7,619	9,351	113,934
Initial (percent)	73.2%	77.1%	76,810
Repeat (percent)	26.8%	22.9%	37,124
Specimens: Unsatisfactory	80	114	1,984
HT Borderline	719	1,120	10,411
HT Presumptive	22	33	260
PKU Borderline	0	3	8
PKU Presumptive Positive	0	1	9
GAL Borderline	2	4	301
GAL Presumptive Positive	1	2	36
FAS (Sickle cell trait)	81	94	977
FAC (Hb C trait)	18	20	264
FAX (Hb variant)	12	19	173
FS (Sickle cell disease)	2	5	29
FSC (Sickle C disease)	0	2	13
FC (Hb C disease)	0	0	4

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

LATE BREAKERS

☞ Lead poisoning continues to be a problem in Missouri. Treating a child with an elevated blood lead level can increase the lead level IF the child's home (or environment) has not been both inspected and remedied, or, the child has not been removed from the environment until remediation has been performed. Chelation therapy causes lead to be absorbed at an increased rate and can result in a higher lead level than the initial one if the patient continues to be exposed to a lead source. This issue is particularly important when using oral chelating agents, administered on an out-patient basis. To arrange for a lead inspection, call your local health department or the Lead Program at (800) 575-9267. It is crucial to immediately report an elevated blood lead level >9mg/dl.

☞ A surveillance project for meningococcal disease and varicella on college campuses is being conducted by the American College Health Association (ACHA) with technical consultation from the Centers for Disease Control and Prevention. The goals of the project are to determine if college students in the United States are at increased risk for meningococcal disease and identify groups at highest risk, and to determine the occurrence, characteristics and clinical profile of varicella and herpes zoster among college students. Results will be utilized in review of recommendations for use of meningococcal and varicella vaccines among college students. During the week of April 12, packets were sent to approximately 1,600 colleges affiliated with ACHA. For more information, contact Georgia Storm in the Bureau of Immunization at (800) 699-2313.

Recommendations for Immunization of Health-Care Workers

In the December 26, 1997 issue of the Centers for Disease Control and Prevention Weekly Morbidity and Mortality Report (MMWR), RR-18, the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC) published new recommendations for the immunization of health-care workers (HCWs). These recommendations can assist hospital administrators, infection control practitioners, employee health physicians and HCWs in optimizing infection prevention and control programs. Recommendation for administration of vaccines and other immunobiologic agents to HCWs are organized in three broad disease categories:

- Those for which active immunization is strongly recommended because of special risks for HCWs (i.e., hepatitis B, influenza, measles, mumps, rubella and varicella)
- Those for which active and/or passive immunization may be indicated in certain circumstances (i.e., tuberculosis, hepatitis A, meningococcal disease) or in the future (i.e., pertussis); and
- Those for which immunization of all adults is recommended (i.e., tetanus, diphtheria and pneumococcal disease).

Information on immunizing immunocompromised HCWs, postexposure prophylaxis and work restrictions are also included in the recommendations.

If you have questions about immunizations for health-care workers, or would like a copy of the recommendations, please call the Bureau of Immunization at (800) 699-2313.

A copy of the recommendations is also available through the Centers for Disease Control and Prevention Internet Home Page at **http://www.cdc.gov/epo/mmwr/preview/ind97_rr.html**.

Reprinted with permission from Arizona Prevention Bulletin, January/February 1998.

Tuberculosis Testing Project in Charleston, MO

Lynn Tennison, R.N.
Vic Tomlinson
Bureau of Tuberculosis Control

The Charleston Tuberculosis Testing Project was initiated on November 26, 1997 due to the large number of active tuberculosis (TB) cases that had occurred in a particular section of Charleston, MO since 1981, and the large number of reported TB infections without disease that had occurred in the same section of Charleston since 1991. See sidebar and Figure 1.

Tuberculosis in Charleston, MO

Active Tuberculosis	Tuberculosis Infection
1981–97	**1991*–97**
30 Cases	39 Reports
Southwest Charleston	**Southwest Charleston**
70% (21/30) Live in SW	74% (29/39) Live in SW
13 Male/8 Female	15 Male/14 Female
21 African American/0 White	29 African American/0 White
18 Age 25–44	19 Age 25–44

*Tuberculosis infections have only been reportable in Missouri since 1991.

The main concern was that most of the cases were occurring in the southwest area of Charleston. The TB disease case rate for that area was 35/100,000 persons, which is more than seven times the state rate. For this reason, the Mississippi County Health Department and the Missouri Department of Health (DOH) approached the community about organizing a skin-testing initiative to identify individuals who might be transmitting tuberculosis, and to prevent people from developing active disease.

The proposal for the TB skin testing was first presented to the Mississippi County Board of Health for their endorsement. Then the TB problem was discussed with additional community leaders to make them aware of the problem in their community. The community leaders of the Charleston Ministerial Alliance played a key role in educating the community about tuberculosis. Initially, the ministers requested 500 flyers to be inserted into church bulletins. The flyer contained educational information about tuberculosis and the TB testing project to be conducted on January 6, 1998. After the flyers were distributed in the church bulletins, DOH staff met with volunteers. At the meetings, volunteers chose the area they would work in and then DOH staff trained them to perform that particular job.

Fourteen volunteers went door-to-door in the southwest community on the Saturday before the testing date. They talked with people about the testing project and handed out flyers as reminders. From New Year's Eve through the weekend of the testing, a local supermarket, Wal-Mart and a local liquor store placed the flyers in grocery bags. TB posters were placed in stores and public offices along with a flyer announcing the skin-testing project. Media coverage played a key part in the success of the project. Both of the local newspapers carried front-page articles and ran ads about the testing project.

The skin testing was conducted on Tuesday, January 6, 1998 from 9:00 a.m. to 1:00 p.m. and again from 5:00 p.m. to 8:00 p.m. at the Helen Currin Community Center located in southwest Charleston. A total of 264 individuals were tested. Skin test results were read on Thursday, January 8, 1998 at the same location and during the same time period. A total of 245 individuals (92.8% of those tested) returned to have the test results read, and of that number 32 (13%) were positive.

A total of 30 volunteers and local and district health agency staff helped with the skin testing on January 6. Volunteers provided assistance by completing paperwork on those who were tested, serving refreshments and providing transportation to and from the testing site. They also continued to talk with people in the community to make them aware of the testing project. On January 8, when the skin test results were read, volunteers again provided transportation, assisted with paperwork and handed out restaurant coupons. They also called people to remind them to come back to have their test results read.

Incentives were used to encourage people to participate in the skin testing and to return to have their test results read. The incentives included refreshments, such as cookies and punch, served the day of the testing, and $2.00 restaurant coupons given out when they returned to have their test read.

No cases of active tuberculosis disease were discovered as a result of the skin testing project. However, 32 people were found to have a positive (reactive) skin test. After questioning, we were able to determine that nine (28.1%) of these individuals had positive skin tests in the past, and four of the nine had received INH preventive therapy. Six (18.8%) of those with positive skin tests were found to be contacts to a person who had been diagnosed with tuberculosis within the past nine months.

Using Centers for Disease Control and Prevention guidelines, twelve (37.5%)

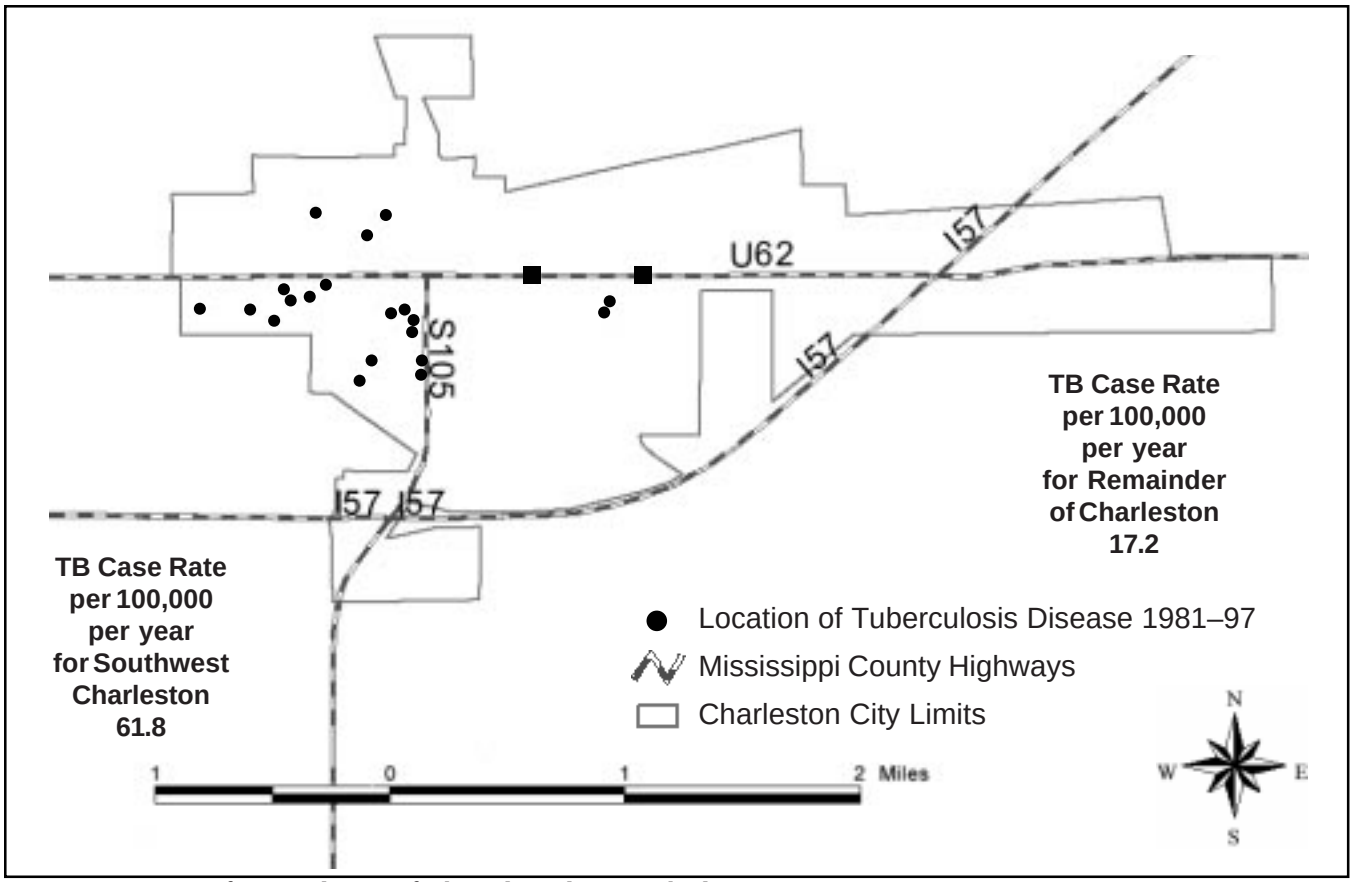


Figure 1. Location of reported cases of tuberculosis disease, Charleston, Missouri, 1981–1997.

individuals were determined to be at high risk for developing active tuberculosis and were started on preventive therapy. DOH staff will be working with volunteers in the community to do directly observed preventive therapy (DOPT) for those individuals.

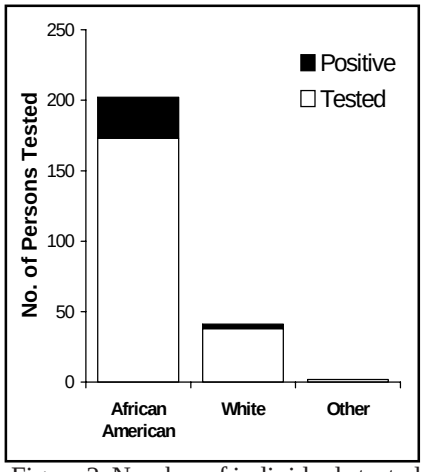


Figure 2. Number of individuals tested and positive by race, Charleston TB Testing Project, Missouri, 1998.

There were 9.4% more women skin tested than men. The majority (82.4%) of those tested were African Americans. See Figure 2. The highest rates of positive reactors were in the 25–44 and ≥65 years age groups, 31.3% and 37.5% respectively. See Figure 3.

In summary, many individuals, both volunteers and public health agency staff, worked together to make this skin testing project a success. Community members played a key role in mobilizing the citizens to take action. Without their involvement and commitment, this project would not have been a success. This project is an excellent example of what can be accomplished to achieve a common goal when the Department of Health, a local public health agency and the citizens of a community work together. Other local agencies, businesses and the local press were all a great asset and also contributed to the success of the project.

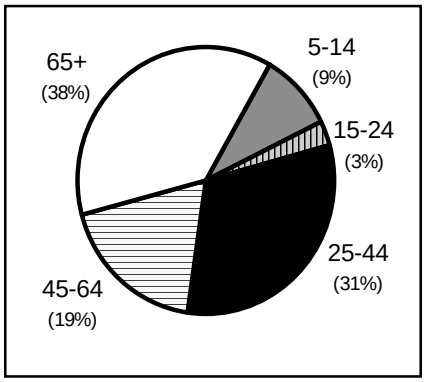


Figure 3. Number positive reactors tested by age group, Charleston TB Testing Project, Missouri, 1998.

We thank Dr. Robert Hamm for his assistance in analyzing the data from the Charleston TB Testing Project.

Heat Surveillance Summary - 1997

Diane C. Rackers
Office of Epidemiology

The summer of 1997 was relatively normal for Missouri with one peak of high heat indexes from July 12 through July 28. The Department of Health issued the only statewide Hot Weather Health Advisory for the summer on July 25 when heat indexes reached 112º in St. Louis, 110º in Kansas City, 108º in Columbia and 105º in Cape Girardeau. The peak of high heat indexes from July 12 through July 28 accounted for 76% (176) of the heat-related illnesses reported in 1997. See Figure 1.

In 1996, one statewide Heat Warning and one statewide Heat Alert were issued. This would be comparable to one Hot Weather Health Advisory and one Hot Weather Health Warning; new terms for heat advisories were adopted in 1997. See sidebar on page 31 for new terms.

In 1997, a total of 232 heat-related illnesses was reported. This is higher than the 198 heat-related illnesses reported in 1996, but considerably lower than the 819 heat-related illnesses reported in 1995. See Figure 2.

In 1997, nine heat-related deaths were recorded. This is two more deaths than reported in 1996, but considerably lower than the 57 heat-related deaths reported in 1995. See Figure 3. Eight (89%) of the heat-related deaths in 1997 were in individuals aged 60 or older.

As in past years, the St. Louis metropolitan area accounted for a large proportion of the heat-related illnesses and deaths in 1997; 126 (54%) of the heat-related illnesses and six (67%) of the heat-related deaths.

St. Louis Operation Weather Survival issued one Hot Weather Health Watch, three Hot Weather Health Advisories and one Hot Weather Health Warning in 1997, all during the high heat index peak from July 12 through July 28. During that time period, St. Louis had 13 days when

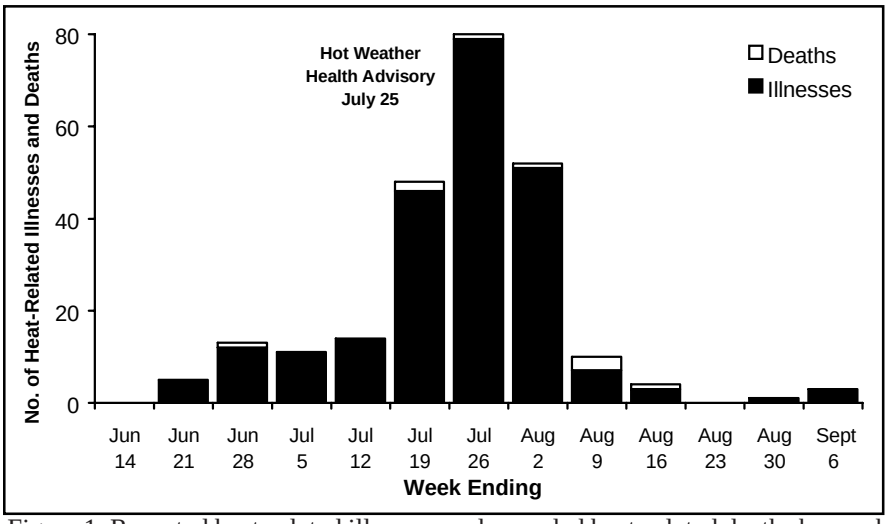


Figure 1. Reported heat-related illnesses and recorded heat-related deaths by week of occurrence, Missouri, Summer 1997.

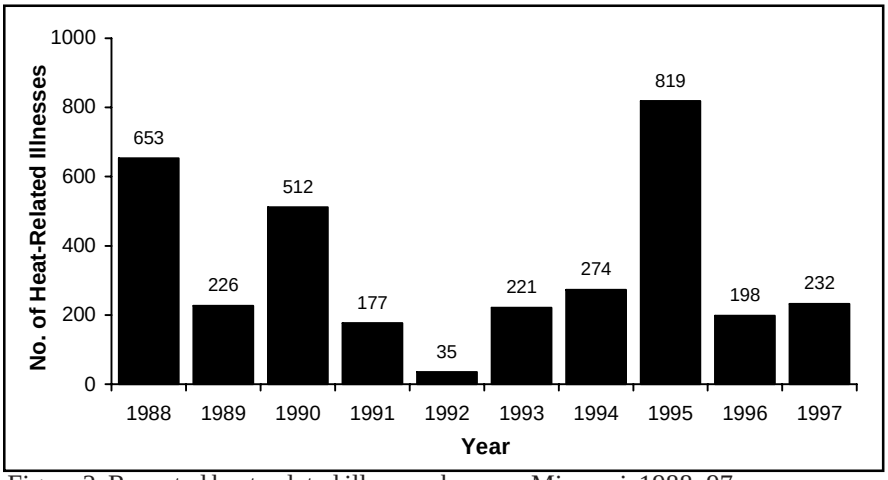


Figure 2. Reported heat-related illnesses by year, Missouri, 1988–97.

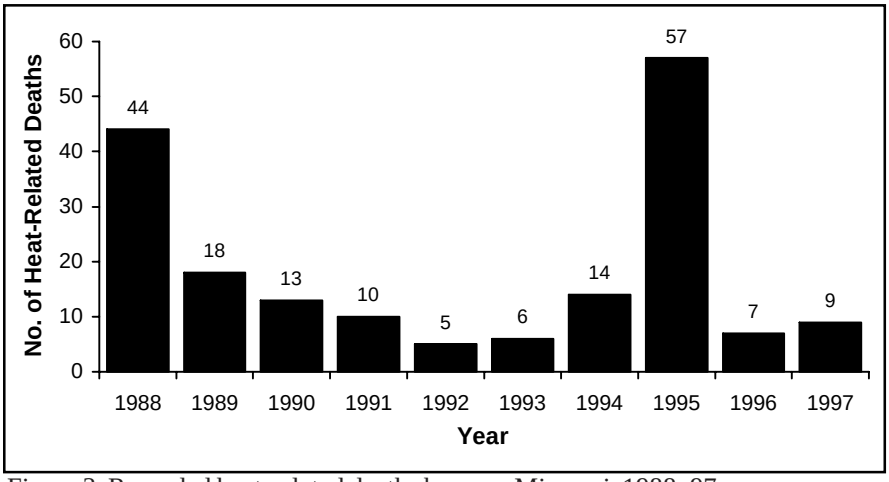


Figure 3. Recorded heat-related deaths by year, Missouri, 1988–97.

the heat index at the St. Louis airport was 100º or higher. We estimate that the heat index in downtown St. Louis during this time period was 105º or higher. Without the diligent efforts of St. Louis Operation Weather Survival the number of heat-related illnesses and deaths in the St. Louis metropolitan area during this time period would very likely have been much higher. This coordinated effort between public health agencies, voluntary organizations, the media and others has been very effective in reducing excess mortality due to stressful weather conditions in the St Louis area.

During periods of high temperatures, physicians, nurses and hospital and nursing home personnel should give special attention to their high risk patients. Attempts should be made to provide air-conditioned environments for such patients. Health care personnel should at least warn such patients regarding their high risk and encourage the drinking of extra non-alcoholic fluids, reduction of activity and close supervision by family, friends or staff, as appropriate.

For patients who have restricted salt or fluid intake, one should consider liberalizing the daily allotments. Weekly or even daily contact with the physician may be necessary. Frequent assessment and reassessment of a patient's fluid and electrolyte status may be highly desirable, especially for those who also are taking diuretics, potassium supplements or other medications which similarly affect electrolyte balance or are affected by changes in electrolyte balance. Routine use of salt tablets is not recommended.

Reemphasize to patients preventive measures to reduce heat-related illness during prolonged hot weather:

- Avoid direct sunlight.
- Stay in coolest location available.
- Spend time in an air-conditioned place.
- Place wet towels or ice bags on the body or dampen clothes.
- Take cool baths or showers frequently.
- Reduce the number of layers of clothing.
- Wear light-weight, loose-fitting garments.
- Avoid strenuous physical activity and reschedule activities, such as shopping, to a cooler time of day.
- Increase intake of fluids such as water and juices.
- Avoid alcoholic beverages (beer, wine or liquor).
- Contact family or friends at least once a day.

Prompt notification of heat-related illnesses and deaths is essential for an effective heat surveillance system. If you are aware of heat-related illnesses or deaths, please report them promptly to your local health department.

Further information on prevention of heat-related illness and past surveillance data for Missouri can be obtained through the Department of Health Home Page at **http://www.health.state.mo.us/cgi-bin/uncgi/HeatRelatedInfo.**

Department of Health
Stages of Hot Weather Health Advisories

A statewide **Hot Weather Health Advisory** will be issued when heat indexes of 105° in a large proportion of the state are first reached (or predicted). The Department of Health will inform the public about the risks of heat-related illness and urge concern for those at high risk. Monitoring of temperatures and heat indexes will be intensified. An **Advisory** will not be canceled.

A statewide **Hot Weather Health Warning** will be issued when:

1. Heat indexes, measured at peak afternoon temperatures, have remained at 105° or more for two days in a large proportion of the state **and**
2. When weather predictions are for continued high-stress conditions for at least 48 hours in a large proportion of the state.

During a **Warning**, the Department of Health will encourage local health departments to assure that cooling shelters are available and also encourage other community agencies to provide relief from the heat stress. A **Warning** will be downgraded or canceled when heat indexes in a large proportion of the state fall below 105° for 48 hours and the forecast is for 48–72 hours of continued relief from heat stress.

The Department of Health will recommend to the Governor that a statewide **Hot Weather Health Emergency** be declared when:

1. Extensive areas of the state are experiencing high and sustained levels of heat stress (determined when the heat index reaches 105° for three days); **and**
2. Surveillance data demonstrate increased levels of heat-related illness and death statewide; **and**
3. The National Weather Service predicts that hot and humid conditions are likely to continue for several days in a large proportion of the state.

An **Emergency** will be canceled when the heat indexes in a large proportion of the state fall below 105° for 48 hours and the National Weather Service predictions indicate a low probability for the return of severe conditions for the following 48 to 72 hours.

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
P.O. Box 570
Jefferson City, MO 65102-0570
www.health.state.mo.us

The *Missouri Epidemiologist* is a regularly scheduled bimonthly newsletter published jointly by the Office of Epidemiology, Center for Health Information Management and Epidemiology (CHIME) and the Division of Environmental Health and Communicable Disease Prevention (EHCDP). CHIME's responsibilities include managing health statistical systems, epidemiological functions and information systems of the department. EHCDP's responsibilities include the prevention and control of communicable diseases and environmentally induced illnesses, including the requisite epidemiological investigations.

The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272.

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Office of Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

Upcoming Conference

THE ESSENTIALS OF INFECTION CONTROL

8TH ANNUAL CONFERENCE

September 16–18, 1998
Capitol Plaza Hotel, Jefferson City, MO

Purpose:

This conference is a **STARTING POINT** to prepare health care professionals as facilitators and resource persons in the prevention and control of common nosocomial infections. It will aid the professional **new to the responsibilities of infection control** to manage the everyday responsibilities of infection surveillance, analysis of disease data, and problem identification and resolution. Important resources for assistance **will also be shared**.

Sponsors:

Missouri Department of Health, Missouri Hospital Association, Missouri APIC Chapters and other organizations.

Registration:

For a complete conference brochure and registration form, call (573) 751-6115.

You Should Attend If You Are A:

Health care professional **NEW** to the field or to the tasks of an infection control professional, or who assists with:

- the infection control program in any health care setting (acute care, ambulatory care, home health, long-term care, mental health, public health, rehabilitation, other)
- consultation on infectious disease prevention and control
- outbreak investigation and follow-up
- surveys, investigations or licensing activities relevant to infection control practices.

Experienced infection control professionals will find day 3 of the conference beneficial.

Missouri EPIDEMIOLOGIST

Volume 20, Number 3 *May-June 1998*

Tuberculosis Annual Report for 1997

Vic Tomlinson,
Lynelle Phillips, R.N., M.P.H.
Joyce Wieberg
Bureau of Tuberculosis Control

The number of reported tuberculosis cases nationwide continued to decrease in 1997. According to the Centers for Disease Control and Prevention (CDC) 19,855 cases of tuberculosis were reported in 1997, representing a 7.0 percent decrease from the 21,337 cases reported in 1996. This is the first time since national tuberculosis reporting was initiated in 1953 that the United States has had less than 20,000 cases reported during a one-year period. The case rate decreased from 8.0 per 100,000 in 1996 to 7.4 in 1997. This represents the fifth consecutive year that tuberculosis cases have decreased nationally.

The number of reported tuberculosis cases in Missouri increased by 10.7 percent, from 224 cases in 1996 to 248 cases in 1997. The case rate increased from 4.2 to 4.7 per 100,000 population. See Figure 1 for trends.

For the second consecutive year, the major metropolitan areas accounted for 63 percent of reported cases. Rural areas accounted for 37 percent of the cases. Two of the four major metropolitan areas experienced significant increases in the number of reported cases. St. Louis City increased from 44 to 60 cases (36.4%), and St. Louis County increased from 32 to 47 cases (46.9%). In Kansas City, the number of cases decreased from 48 to 39 cases (-18.8%). In Springfield-Greene County, the number of cases decreased from 17 to 10 cases (-41.2%). The case rates for these areas in 1997 were 17.1 per 100,000 for St. Louis City, 4.7 for St. Louis County, 8.8 for Kansas City, and 4.5 for Springfield-Greene County. See Figure 2 on the next page.

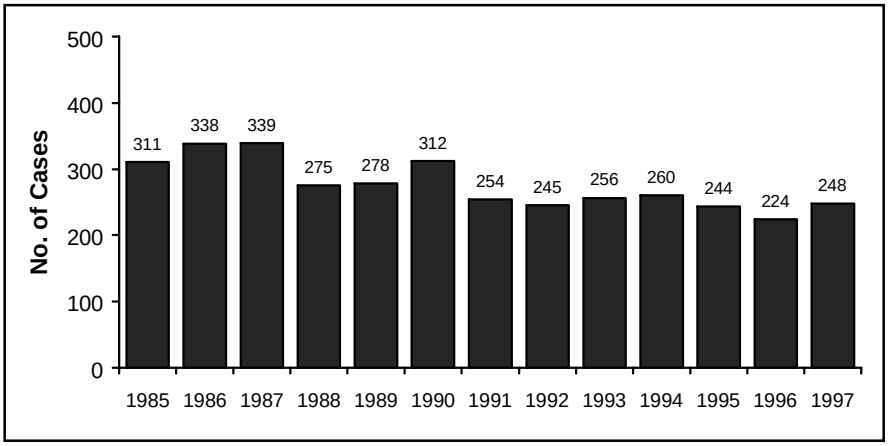


Figure 1. Reported tuberculosis cases by year, Missouri, 1985–97.

The number of reported cases in the rural areas showed an increase of 10.8 percent, from 83 cases in 1996 to 92 cases in 1997. Increases were noted in four of the six health districts. The Northwestern District increased from 12 to 18 cases (50.0%); the Southwestern District increased from 11 to 15 cases (36.4%); the Southeastern District increased from 27 to 30 cases (11.1%); and the Central District increased from 17 to 18 cases (5.9%). The Northeastern and Eastern Districts experienced decreases in the number of reported cases. The Northeastern District decreased from 4 cases to 1 case (-75.0%) and the Eastern District decreased from 11 to 10 cases (-9.1%). A decrease from one case to no cases was observed in the state and federal correctional institutions. See Figure 2 on the next page.

Reported cases of tuberculosis among males continued to outnumber those in females. In 1997, 61.3 percent (152) of the cases were male and 38.7 percent

(continued on page 2)

Inside this Issue...

(continued from page 1)
(96) were female. In 1996, 64.7 percent (145) of the cases were male and 35.3 percent (79) were female.

In 1997, individuals with active tuberculosis disease ranged in age from 1 to 93. Increases in reported cases were observed in all but the 25–44 age group. As in prior years, the largest number of cases occurred in persons 65 and over. See Figure 3.

Tuberculosis case rates vary significantly among racial and ethnic groups. From 1996 to 1997, case rates per 100,000 population increased among whites (from 2.5 to 2.6); blacks (from 12.0 to 16.8); and Hispanics (from 9.5 to 23.1). However, case rates among Asians decreased from 62.1 to 50.7. While this decrease is welcome, the case rate among Asians is still noticeably high. See Figure 4.

The largest proportion of active disease cases, 81.0% (201 cases) were pulmonary compared to 19.0% (47 cases) which were extrapulmonary. There were 17 cases with dual-disease sites. The sites of extrapulmonary disease were lymphatic (18), pleural (11), bone (7), meningeal (3), miliary (2), genitourinary (2), peritoneal (1) and other (3). See Figure 5.

Tuberculosis infection means that the person has been exposed to the bacteria that cause tuberculosis. They are not sick because the bacteria are inactive. They cannot spread the bacteria to others. A person with tuberculosis infection usually has a positive skin test, a normal chest x-ray and does not feel sick.

Tuberculosis disease means that the person is sick from bacteria that are actively reproducing in their body. Persons with pulmonary tuberculosis usually have a positive skin test, an abnormal chest x-ray and one or more of the symptoms of tuberculosis such as persistent cough, chest pain, feeling weak, weight loss, fever and/or night sweats. These people are often capable of giving the infection to others.

In 1997, drug susceptibility studies were performed on 204 (82.3%) of the 248 tuberculosis cases reported. Five (2.5%) of these 204 cases were found to have multiple-drug resistant organisms. In addition, the isoniazid resistance rate remained high at seven percent. When the isoniazid rate exceeds four percent, initial use of four tuberculosis drugs is recommended for all active disease patients and suspects.

A comparison of the tuberculosis case register and the HIV/AIDS case register is done on a quarterly basis to discover cases with both conditions. This matching process is presently done manually, but computerized matching of databases is anticipated in the fall of 1998 after the Missouri Department of Health has implemented its integrated data network (MOHSAIC). For the period of January through June 1997, the manual-matching process discovered four cases of tuberculosis/AIDS, 31 cases of mycobacteria other than tuberculosis (MOTT)/AIDS and one report of tuberculosis infection/AIDS. Of the four cases of tuberculosis/AIDS, one was reported from St. Louis City, two from St. Louis County and one from Kansas City. These four cases were between the ages of 25 to 44 and all were male.

In 1997, no active tuberculosis disease cases were reported in the state correctional system as compared to one case in 1996 and three in 1995. During 1997, a total of 41,582 inmates were skin tested. Of those, 655 (1.6%) were identified as new positives and 3,981 (9.6%) had a history of previously positive skin tests. In 1997, a total of 9,198 state correctional system employees were tested. Of those tested, 106 (1.2%) were identified as new positives and 842 (9.2%) had a history of previously positive skin tests.

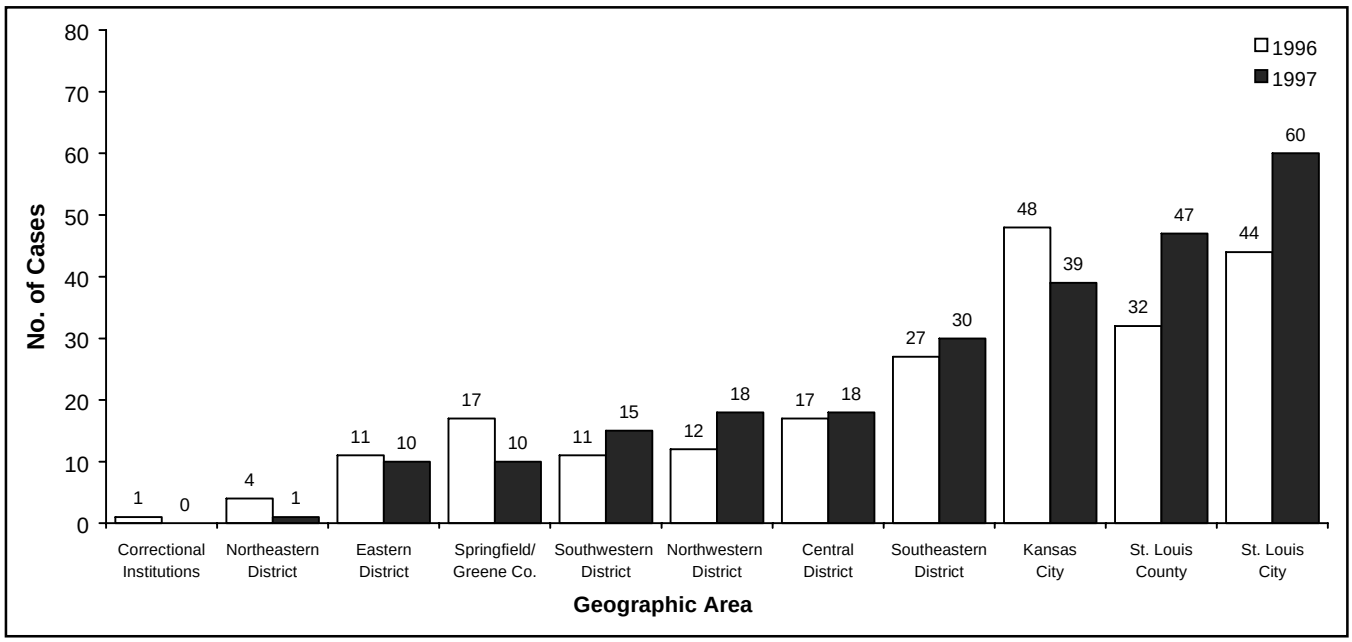


Figure 2. Reported tuberculosis cases by geographic area, Missouri, 1996 and 1997.

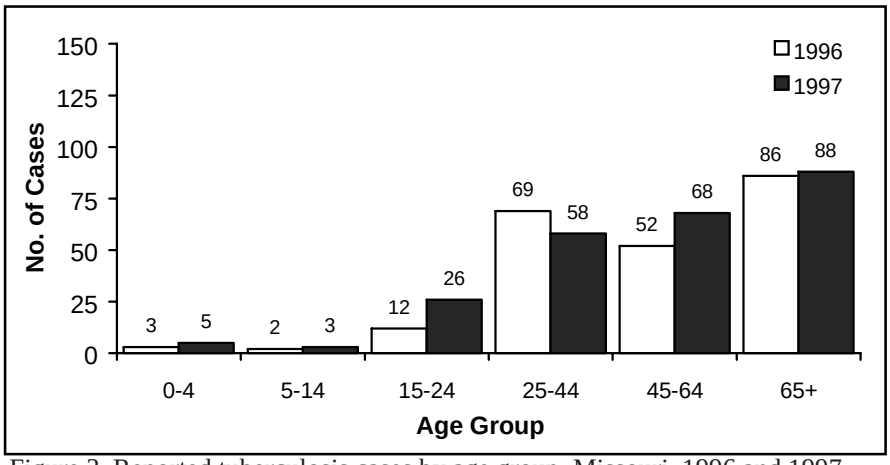


Figure 3. Reported tuberculosis cases by age group, Missouri, 1996 and 1997.

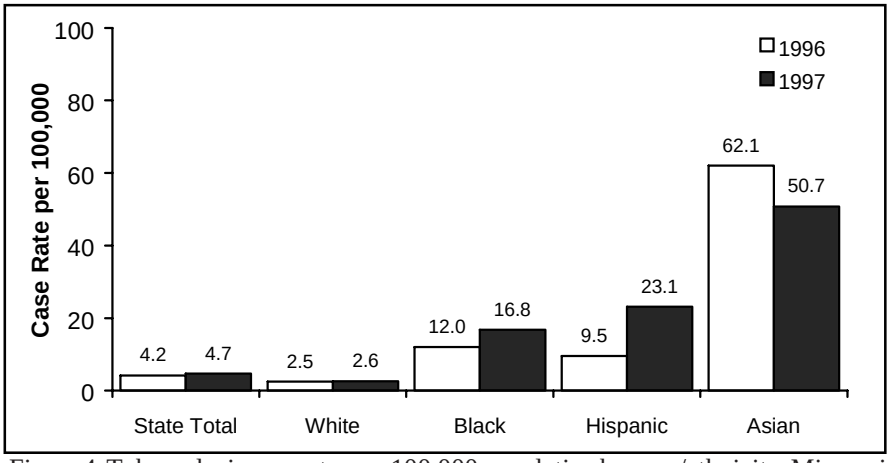


Figure 4. Tuberculosis case rates per 100,000 population by race /ethnicity, Missouri, 1996 and 1997.

The number of tuberculosis cases reported in nursing homes is of concern to the Bureau of Tuberculosis Control. These facilities accounted for 12 (4.8%) of the reported cases in 1997. The bureau continues to address this issue by working closely with nursing home associations, residential care associations and the Division of Aging to provide facilities with the recommendations for tuberculin skin testing and follow-up of residents and employees.

The number of tuberculosis cases occurring among foreign-born persons increased from 40 (18 percent of reported cases) in 1996 to 52 (21 percent of reported cases) in 1997. Case rates among Asians, who are mostly foreign-borne, are disproportionately higher than for other racial and ethnic groups.

The initial use of four tuberculosis medications is another priority for the bureau in order to lower the drug resistance rate. All active disease patients, and all suspects, should be started on four medications from the beginning of treatment until drug susceptibility is determined. Those medications include isoniazid, rifampin, pyrazinamide and ethambutol or streptomycin. In 1995, only 50.6 percent

(continued on page 17)

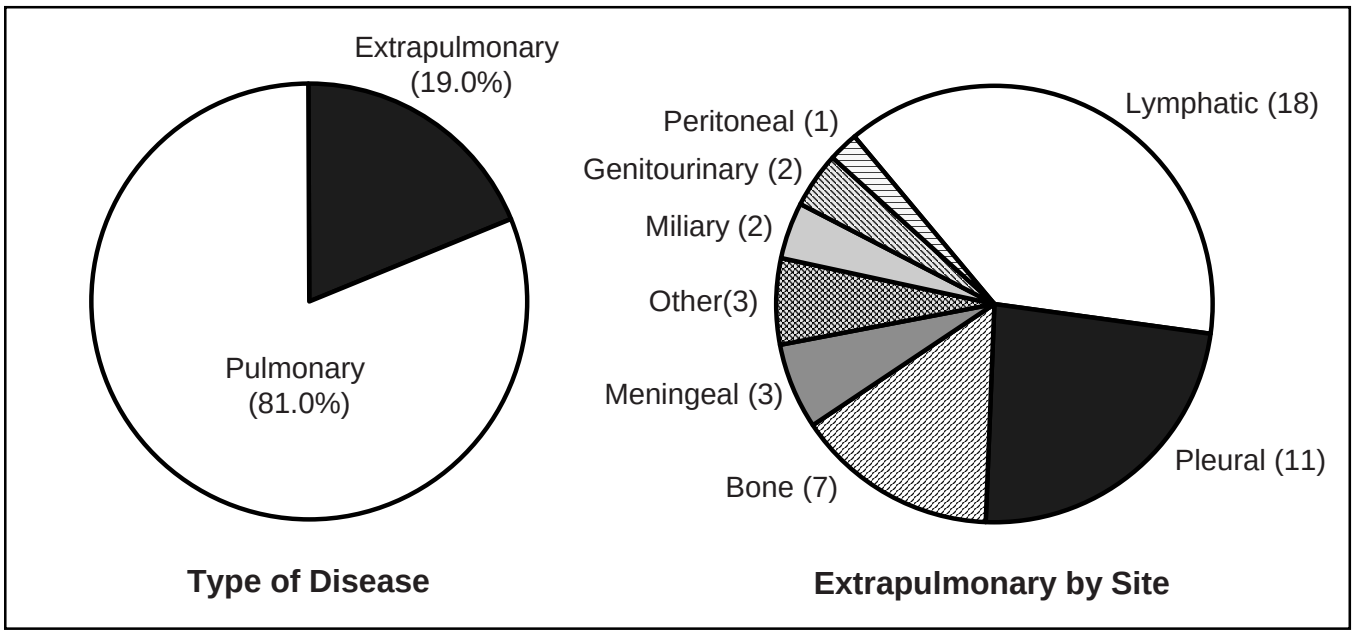


Figure 5. Reported tuberculosis cases by type of disease and site, Missouri, 1997.

1997 Outbreaks of Communicable Disease*

Howard L. Pue, D.V.M., M.S.
Michael Fobbs, B.A.
Office of Surveillance

While the principles of outbreak investigation remain constant, each infectious disease outbreak or cluster differs, making it necessary to approach the investigation with creativity and innovation. Unraveling the source of an outbreak requires collaborative interaction between personnel in various roles and work settings. Depending upon the complexity of an outbreak, interaction may involve federal, state, local and facility-based personnel. These persons function as a team and each plays an integral part in resolving an outbreak or cluster. The Bureau of Communicable Disease Control is grateful for the assistance of persons in every part of the state who contribute time, intense effort and expertise helping to protect Missouri citizens from infectious diseases.

In 1997, 31 communicable disease outbreaks were reported in Missouri involving 928 people. This is a decrease of 22.5 percent from the 40 outbreaks reported in 1996. These outbreaks involved many different modes of transmission and widely varying etiologic agents in a variety of settings. The modes of transmission were as follows: 19 were suspected person-to-person transmission involving 655 people, ten were foodborne and impacted 254 people, one was waterborne involving eight people swimming at a beach, and one was airborne involving 11 people exposed to vaporizers in a group home.

Schools (elementary, secondary and one college) were the most common settings for outbreaks in 1997, accounting for ten (32.2 %) of the 31 reported outbreaks.

Table 1. Communicable disease outbreaks by cause, setting and number of cases, Missouri, 1997.

Disease/ Mode of Transmission	No. of Outbreaks	Setting	No. of Cases
Acute Gastrointestinal Illness of Unknown Etiology/			
Foodborne	6	FG, 3R, 2S	105
Person-to-Person	5	CC, R, 3S	147
Waterborne	1	H	8
Total	**12**		**260**
Hand, Foot and Mouth Disease/ Person-to-Person	2	2CC	13
Influenza-Like Illness/ Person-to-Person	2	I, W	32
Salmonellosis/Foodborne	2	C, R	121
Shigellosis/Person-to-Person	2	C, CC	20
Acute Respiratory Illness from Multiple Bacteria/Waterborne	1	GH	11
Campylobacter/Person-to-Person	1	GH	28
Chickenpox/Person-to-Person	1	CC	5
Clostridium perfringens/Foodborne	1	FG	21
Fifth Disease/Person-to-Person	1	S	5
Hepatitis A/Person-to-Person	1	S	7
Influenza A (culture confirmed) Person-to-Person	1	S	350
Pediculosis/Person-to-Person	1	S	15
Ringworm, Scalp/Person-to-Person	1	S	15
Rotavirus/Person-to-Person	1	CC	18
Staphylococcus aureus/ Foodborne	1	R	7
TOTAL	**31**		**928**

Key:
C =Community-Wide
CC =Child Care
FG =Family Gathering
GH =Group Home
H =Hotel
I =Prison or Other Correctional Facility
R=Restaurant
S =School
W=Workplace

Child care facilities and restaurants were second with six (19.4%) outbreaks each. Two (6.4%) outbreaks occurred in each of the following settings: community-wide (no association with any specific activity), private homes and group homes. Single (3.2%) outbreaks occurred in a hotel, a state government office and a private business office. The largest single event was an outbreak of culture-confirmed influenza A in a college affecting 350 students. Out-

*Does not include outbreaks related to sexually transmitted diseases, tuberculosis, vaccine-preventable diseases and zoonotic diseases. These disease outbreaks are covered in other articles contained in this issue.

breaks are shown in Table 1 categorized by cause, setting and number of cases.

In the past, only culture-confirmed cases were accepted as influenza; all others were considered to be influenza-like. As of January 1998, positive results from direct enzyme immunoassay (EIA) "rapid" tests are accepted as diagnostic of influenza. This change must be considered in future analysis of influenza and influenza-like disease incidence data. An advantage of this method of testing is the half-hour response time, which makes it very useful for physicians and laboratories. However, the kit tests only for influenza type A and does not allow for subtyping. If other types are suspected or if subtyping is desired, please contact the State Public Health Laboratory for assistance at (573) 751-3334.

The largest category of outbreaks reported during 1997 was acute gastrointestinal illness (AGI) of unknown etiology (12 outbreaks affecting 260 people). Foodborne transmission was the most common mode, being implicated in six of these outbreaks. Five AGI outbreaks were the result of person-to-person transmission. One incident involved individuals who had been swimming in a lake with a high coliform count. AGI outbreaks occurred in the following settings: five schools, four restaurants, one child care facility, one recreational facility and one private home.

Hand, foot and mouth disease (enteroviral vesicular stomatitis with exanthem) was the culprit in two outbreaks that affected 13 people. The outbreaks occurred in child care settings and were the result of person-to-person transmission.

Influenza-like illness was diagnosed in two outbreaks encompassing 32 people. One outbreak affected employees of a state government office while the other occurred at a private business office. The mode of transmission was person-to-person.

Table 2. Nosocomial disease outbreaks by cause and number of cases, Missouri, 1997.

Disease/ Mode of Transmission	No. of Outbreaks	No. of Cases
Scabies/Person-to-Person	14	323
Acute Gastrointestinal Illness of Unknown Etiology/ Person-to-Person	6	186
Chickenpox/		
Airborne	2	9
Person-to-Person	1	3
Total	**3**	**12**
Pediculosis/Person-to-Person	3	41
Acute Respiratory Illness of Gram-Negative Rods/Person-to-Person	1	27
Influenza/Person-to-Person	1	75
Respiratory Syncytial Virus/ Person-to-Person	1	5
Methicillin-Resistant *Staphylococcus aureus*/ Person-to-Person	1	3
Phthirus Pubis/ Person-to-Person (possible fomite)	1	4
Fungal Rash/Person-to-Person	1	6
Legionellosis/Airborne	1	4
TOTAL	**33**	**686**

Salmonella sp. were incriminated in two outbreaks. Both outbreaks resulted from foodborne transmission of rare serotypes and affected a total of 121 people in Missouri. An outbreak caused by *S. agona* involved 105 people who had eaten in the same restaurant over a period of time. The second outbreak affected 16 people in Missouri plus a total of 93 people in Kansas, Oklahoma and Minnesota. This outbreak was caused by growing alfalfa sprouts from seeds contaminated with *S. infantis* and *S. anatum* with subsequent distribution of the sprouts to grocery stores, restaurants, and wholesalers.

Shigellosis was diagnosed in two outbreaks affecting a total of 20 people. One outbreak occurred in a child care facility and was the result of person-to-person transmission. The other outbreak was community-wide and assumed to be caused by person-to-person transmission since foodborne and waterborne transmission were ruled out.

The year also saw 11 people in a group home who suffered acute respiratory illness caused by gram-negative rods associated with water in vaporizers and 28 cases of campylobacter infection resulting from person-to-person transmission in a group home. Other outbreaks in a school setting included five cases of Fifth disease (erythema infectiosum) spread person-to-person in a classroom, seven students with suspected person-to-person transmission

(continued on page 39)

Tick-Borne Disease Summary - 1997

Laura E. Hardin, D.V.M., M.S.
F. T. Satalowich, D.V.M., M.S.P.H.
Bureau of Veterinary Public Health

Rocky Mountain Spotted Fever

Illness

Rocky Mountain Spotted Fever (RMSF) is characterized by sudden onset of symptoms including headache, conjunctivitis, peripheral and periorbital edema, chills, fever lasting two to three weeks, myalgia and a characteristic maculopapular rash which usually appears on the second to sixth day.

The rash is the most characteristic and helpful diagnostic sign. It usually appears first on the wrists and ankles and may include the palms and soles, spreading centripetally to the rest of the body. If treatment is delayed, petechiae and purpuric skin lesions are common. Medical professionals are encouraged to investigate the possibility of tick exposure when diagnosing illnesses in patients presenting with these symptoms.

Organism and Transmission

The infectious agent of RMSF is *Rickettsia rickettsii*. Even though dogs, rodents and other small animals may harbor the rickettsiae, the principle vector and reservoir is the tick, *Dermacentor variabilis* (the American dog tick). Wild rodents and lagomorphs are reservoirs for the disease, however, ticks also act as a reservoir through transovarial transmission.

Epidemiology

Ninety percent of the rickettsial diseases that occur annually in the United States are RMSF. During the 1980s, approximately 50 deaths per year were attributed to RMSF. An endemic focus for RMSF exists in Missouri, Arkansas, Oklahoma and Texas. Twenty-four cases were reported in Missouri in 1997. Figure 1 shows location of cases by county. The highest number of cases, 54, was reported in 1988. Since 1988, the number of cases reported per year has declined, probably due to the normal cycling of disease.

Better diagnostic procedures are allowing for early diagnosis of cases, and antibiotic treatment is very effective. The severity of RMSF cannot be discounted, as five deaths in the past ten years in Missouri have been attributed to RMSF.

Tularemia

Illness

Tularemia is characterized by fever, chills, myalgia and headache. Onset is frequently abrupt and conforms to a specific syndrome. The most common syndrome, ulceroglandular, is characterized by 1) painful maculopapular lesion at the portal of entry with subsequent ulceration and slow healing; and 2) painful, acutely inflamed lymph nodes that may drain spontaneously. The other common syndromes are: **glandular**—no skin or mucous membrane involvement, **oropharyngeal**—severe exudative pharyngitis, **oculoglandular—**severe conjunctivitis and preauricular lymph node involvement, **typhoidal**—high fever, hepatomegaly and splenomegaly and **pneumonic**.

Organism and Transmission

Tularemia, also called rabbit fever and deerfly fever, is a disease of man and animals caused by the bacteria *Francisella tularensis*, a small gram-negative coccobacillus. The bacteria is transmitted from wild and domestic mammals by blood-sucking arthropods (e.g. tick, deerfly, mosquito). In the United States, rabbits and ticks are major sources of infection. Infected animals and arthropods are infective for prolonged periods: frozen, killed rabbits can remain infective for more

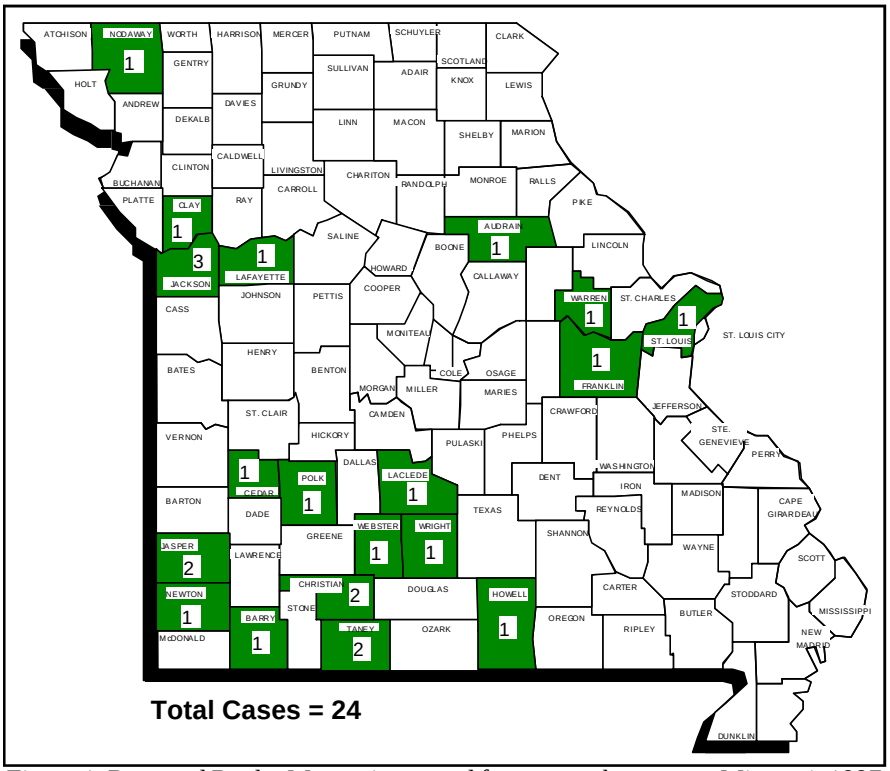


Figure 1. Reported Rocky Mountain spotted fever cases by county, Missouri, 1997.

than three years. Persons at highest risk are those with occupational or recreational exposure to infected animals and their habitat, and laboratory technicians working with *F. tularensis*.

Epidemiology

Tularemia is enzootic in animals throughout the continental United States and in most areas of the world between 30 to 71 degrees north latitude. Based on biogeographic epidemiology, Missouri lies in one of the two recognized tularemia regions in the North American continent. This region, called the Ozark Plateau, encompasses portions of Missouri, Arkansas, Oklahoma and Kansas. This oldest tick-borne disease in Missouri has declined from an average of 35 cases per year over the past 15 years to a record low of only nine cases reported in 1996. In 1997, 18 cases were reported in Missouri. Figure 2 shows location of cases by county. Many factors affect the organism, the vector and the host. Variation in any of these factors produce cycles in disease incidence. At the present time, tularemia is at a low ebb. Most tularemia cases in Missouri occur south of the Missouri River.

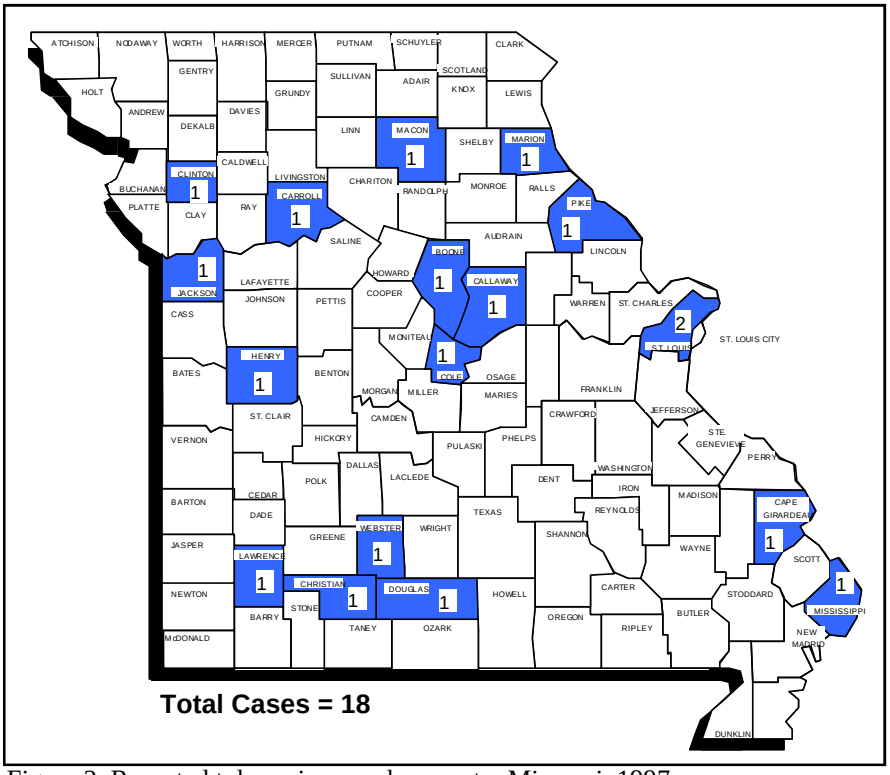


Figure 2. Reported tularemia cases by county, Missouri, 1997.

Ehrlichiosis

Illness

Ehrlichiosis is an acute febrile illness. As with other tick-borne diseases, it has an acute onset with flu-like symptoms including headache, myalgia, anorexia, nausea and, in some instances, a rash. Clinical laboratory abnormalities include leukopenia, thrombocytopenia and elevated levels of hepatic amino-transferase.

Organism and Transmission

Ehrlichiosis is caused by the organism *Ehrlichia chaffeensis*, a rickettsial species. The organism is commonly transmitted by *Amblyomma americanum* (the Lone Star tick), though *Dermacenter variabilis* can also be a vector.

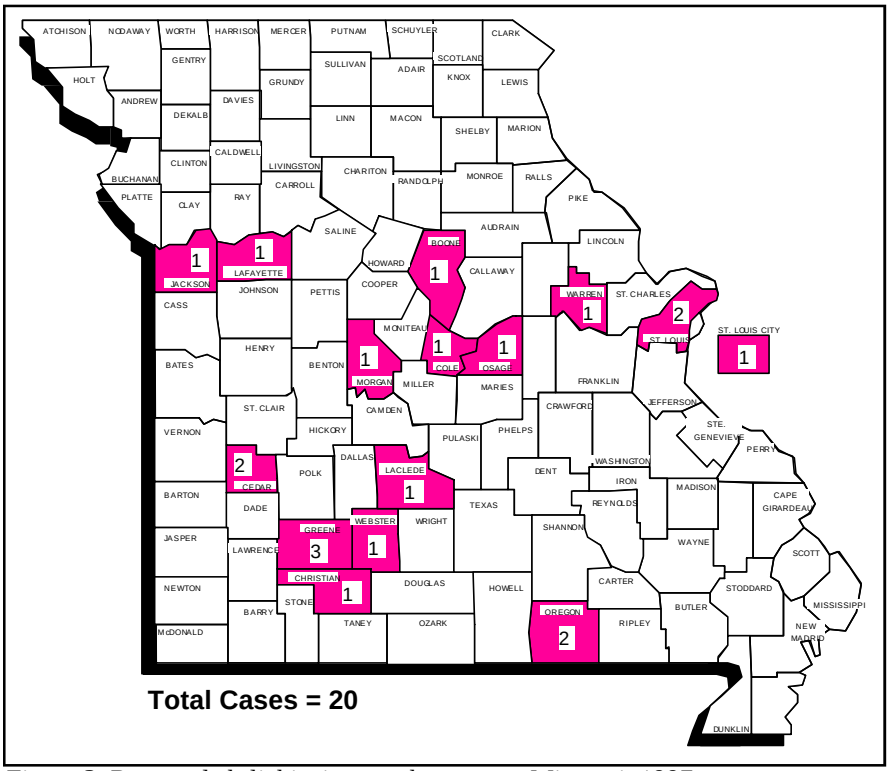


Figure 3. Reported ehrlichiosis cases by county, Missouri, 1997.

Epidemiology

A total of 142 human ehrlichiosis infections were reported in Missouri since 1988, or an average of 15 cases per year. Missouri continues to account for the majority of the ehrlichiosis cases reported nationally, with central

(continued on page 8)

(continued from page 6)

Missouri being the epicenter of the state. In 1997, 20 cases of ehrlichiosis were reported. Figure 3 shows location of cases by county.

Borreliosis

Illness

Clinical manifestations of borreliosis are divided into three stages: early localized, early disseminated and late disease. Early localized disease is manifested by a distinctive rash at the site of a recent tick bite. The rash begins as a red macule or papule and usually expands during days to weeks to form a large annular lesion that is 5 cm or more in diameter. This characteristic rash, erythema migrans, can vary in size and shape and is often accompanied by fever, malaise, headache, mild neck stiffness and arthralgia.

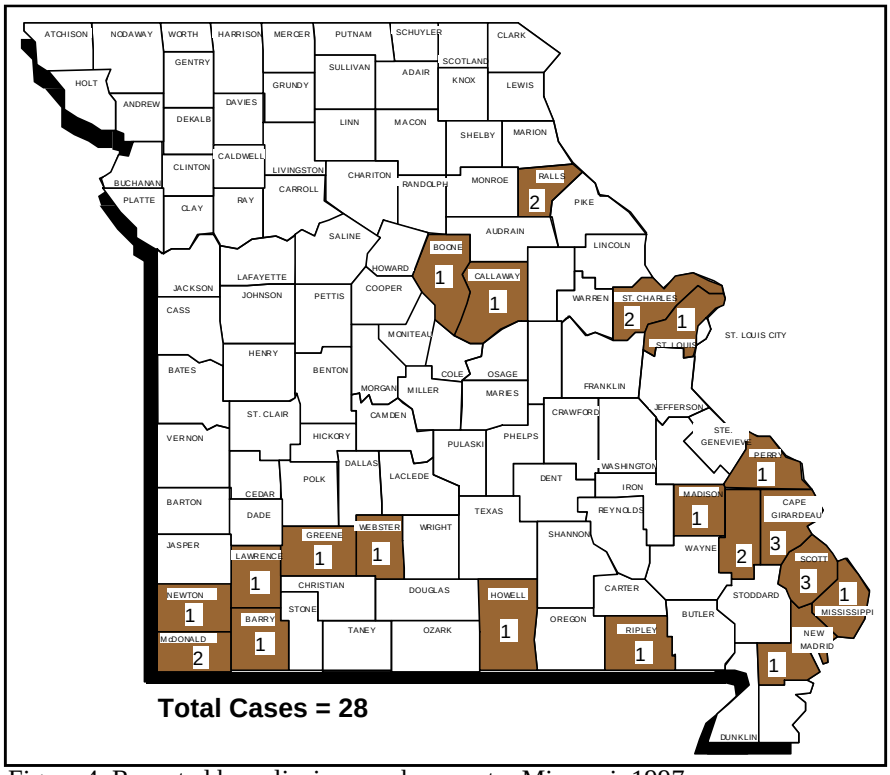


Figure 4. Reported borreliosis cases by county, Missouri, 1997.

The most common manifestation of early disseminated disease is multiple erythema migrans. This rash usually occurs three to five weeks after the tick bite and consists of secondary annular erythematous lesions, similar to, but smaller than the primary lesion. Other common manifestations of this stage are palsies of the cranial nerves, meningitis and conjunctivitis, arthralgia, myalgia, headache and fatigue. Carditis, which usually is manifested by various degrees of heart block, rarely occurs.

Late disease most commonly is characterized by recurrent arthritis. Chronic arthritis is uncommon in children who have been treated with antibiotics in the early stages. Arthritis may occur without the early disease manifestations. Central nervous system manifestations also occur late in the disease, and include encephalopathy and neuropathy, including one or more peripheral nerves.

Organism and Transmission

Borreliosis is caused by *Borrelia spp.*, spirochetes transmitted by ticks to wildlife and man. The tick most commonly reported as the vector for borreliosis is *Ixodes scapularis (*formerly *Ixodes dammini*). *I. scapularis* is not common in Missouri. Other possible vectors in Missouri include *Amblyomma americanum* (the Lone Star tick) and *Dermacentor variabilis* (the American dog tick).

Epidemiology

Borreliosis has become the most commonly reported vector-borne disease in the United States. Ninety percent of all cases are reported from the northeastern United States. There were 28 cases of borreliosis reported in Missouri in 1997 that met the case criteria set by the Centers for Disease

Personal Protection Against Tick-Borne Diseases

- Avoid known tick-infested areas.
- Apply repellents such as diethyltoluamide (DEET) and dimethylphthalate to clothing and exposed parts of the body. (These repellents are active ingredients in many popular insect repellents. Read and follow label directions.)
- Wear clothing that interferes with tick attachment (boots, full length and one-piece outer garments).
- Avoid sitting on grass and logs where exposure to ticks increases.
- Every four to six hours, inspect entire body, including scalp, arm pits and groin, to detect and remove attached ticks.

Table 1. Reporting Criteria for Tick-Borne Diseases
(A confirmed case meets both clinical and laboratory criteria.)

	Ehrlichiosis	Tularemia	Rocky Mountain Spotted Fever	Borelliosis*
Clinical	Tick exposure, acute onset, febrile myalgia, headache, rigor, malaise	Several disease forms, ulceroglandular, intestinal, pneumonic	Tick exposure, acute onset, febrile, myalgia, headache, petichial rash	Characteristic erythematous rash >5 cm in diameter **OR** Chronic manifestations
AND				
Laboratory	Four-fold titer rise in IFA for *E. canis* or *E. chaffeensis* **or** PCR **or** *Intracytoplasmic morulae* + IFA >64	Isolate *F. tularensis* **or** four-fold titer rise for *F. tularensis* antigen	Four-fold titer rise in IFA for *Rickettsia rickettsii* **or** PCR **or** isolate	Isolation of *B. burgdorferi* **or** EIA + Blot** **or** IFA + Blot**

*Lab methods are not decisive in Missouri and are not required for confirmation.
**Blot+ is 2/5 IgM and 5/10 IgG bands

Control and Prevention and the Council of State and Territorial Epidemiologists. Figure 4 shows location of cases by county.

Reporting

Disease reporting is a tedious and time-consuming task. However, it is an important component of health care. By analyzing disease occurrence, characteristics of the disease's effect on the population can be better understood. Knowing geographically where specific diseases are occurring and in what populations is important preventive information. This information also alerts physicians and other providers to new or emerging diseases that may be appearing in their patient populations. Tick-borne diseases recognized in a specific location can be controlled to prevent further disease spread. See Table 1 for criteria to be used when reporting tick-borne diseases.

Tick-borne diseases should be reported promptly to your local health department, or to the Bureau of Veterinary Public Health at (573) 751-6136 or (800) 392-0272.

VIDEOCONFERENCES

The Section of Vaccine Preventable and Tuberculosis Disease Elimination will sponsor the following Centers for Disease Control and Prevention (CDC) satellite broadcasts:

Immunization Update 1998
September 10, 1998

This program will provide an update of new vaccines and recommendations as well as changes in the immunization schedule.

Adult Immunization: Strategies That Work
CANCELED
October 8, 1998

Preparing for the Coming Influenza Pandemic
November 20, 1998

This program will identify the main points in the guidelines for influenza pandemic preparedness and discuss a successful local and state preparedness program. In addition, the participants will have the opportunity to form partnerships and to start a plan of action to prepare emergency response plans for handling an influenza pandemic.

Both broadcasts will feature question-and-answer sessions in which participants can address questions to the course instructors on toll-free telephone lines. Continuing education credits will be offered for a variety of professions.

For more information about the course, site locations and broadcast times, please contact the immunization representative located in the district health office or the Section of Vaccine Preventable and Tuberculosis Disease Elimination at (800) 699-2313.

Communicable Disease Control 1997 Annual Report

Caryl Collier, R.N., M.P.H.
Bureau of Communicable Disease Control

Howard Pue, D.V.M., M.S.
Michael Fobbs, B.A.
Office of Surveillance

Enteric Diseases

Hepatitis A was the disease most commonly reported to the Bureau of Communicable Disease Control from across the state this year (as was also the case in 1996), making up 24.7 percent of diseases reported . The majority of the cases occurred in the Southwestern Health District and there seems to be a greater association of hepatitis A with the use of drugs such as methamphetamines than in previous years.

Food safety has become an increasingly important issue at both the state and federal levels. Enteric diseases are some of the most commonly experienced illnesses and are often associated with foodborne exposures.

Cryptosporidiosis increased 8.6 percent from 35 cases in 1996 to 38 in 1997. The largest number of cases (15) was reported from the Southwestern Health District. The Central Health District reported the second highest number of cases (11). All reports were individual cases; there were no reported outbreaks during 1997. Cryptosporidiosis was made reportable in April 1996.

The number of cases of *E. coli* O157:H7 dropped statewide by 21.6 percent from an all-time high of 74 in 1996 to 58 in 1997. The reported total of 58 cases is 45.0 percent above the five-year median of 40 cases. The five-year median is calculated using the annual totals from 1992 to 1996. See Figure 1. The Central and Northwestern health districts saw increases from last year; all other districts had decreases in the number of cases. The highest number of cases (22) was reported in the Eastern Health District, perhaps because one of the major children's hospitals in St. Louis routinely tests for this pathogen. Central and Northwestern health districts tied for the second highest number of cases (14). See Figure 2. *E. coli* was made reportable in midyear 1992, and 1997 is the fifth complete year of reporting. By 1998, the analysis of trends for this disease will be more meaningful. There is still significant underdetection and underreporting of this pathogen, which prospective studies in other states have found to be more common than shigella.[1]

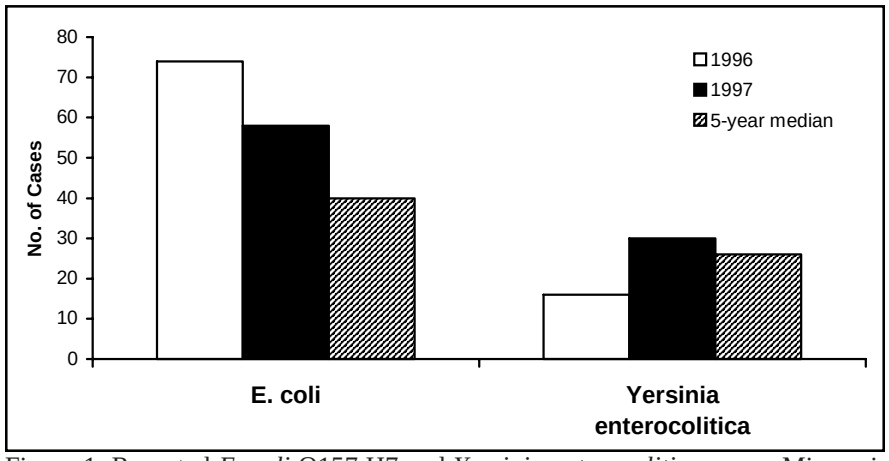


Figure 1. Reported *E. coli* O157:H7 and *Yersinia enterocolitica* cases, Missouri, 1996, 1997 and five-year median.

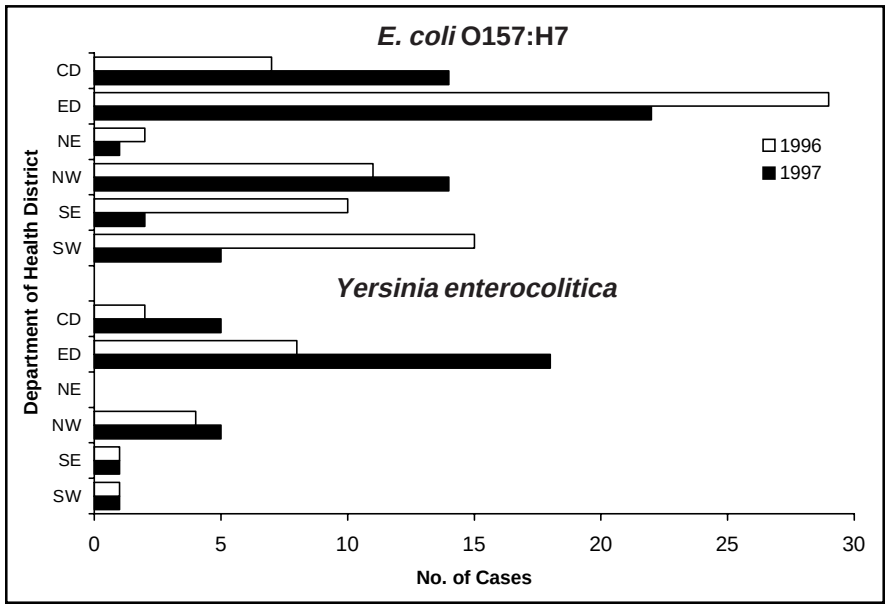


Figure 2. Reported *E. coli* O157:H7 and *Yersinia enterocolitica* cases by Department of Health districts, Missouri, 1996 and 1997.

The number of reported cases of *Yersinia enterocolitica* increased 87.5 percent from 16 cases in 1996 to 30 cases in 1997. These 30 cases are 15.4 percent higher than the five-year median of 26 cases. See Figure 1. As in the past, the largest number of cases was reported among black children in the Eastern Health District (see Figure 2) during the Thanksgiving and Christmas holidays, but a large number of cases were reported from other groups and throughout the remainder of the year.

Key to Department of Health Districts:

CD = Central Health District
ED = Eastern Health District
NE = Northeastern Health District
NW = Northwestern Health District
SE = Southeastern Health District
SW = Southwestern Health District

Reported campylobacter cases increased from 554 in 1996 to 574 in 1997, a change of 3.6 percent. The reported total of 574 cases is 6.5 percent lower than the five-year median of 614 cases. See Figure 3. Central, Northeastern, Southeastern and Southwestern health districts showed an increase in the numbers of reported cases. See Figure 4

Salmonellosis showed a small change in the state total, rising from 565 cases in 1996 to 568 cases in 1997. There was a large increase of 67.7 percent in the Northwestern Health District, largely due to a large restaurant outbreak of *S. agona*. All other health districts experienced decreases in reported cases of salmonella. See Figure 4. The most common serotypes of salmonella reported in 1996 and 1997 are shown in Table 1 on page 16.

Missouri's 1997 reports of shigellosis decreased dramatically by 42.6 percent from 387 cases in 1996 to 222 cases. A large decrease was also seen in 1996, when cases dropped by 66.0 percent from 1,138 reported during 1995. The 1997 incidence was 66.1 percent lower than the five-year median of 654 cases. See Figure 3. In the past, high levels of shigellosis have been associated with hepatitis A outbreaks because the two diseases have similar risk factors. Immunity following infection with shigella is of unknown duration, and increases in shigellosis cases, particularly in urban areas, may be associated with waning levels of protection. Thus, previously infected individuals could again be placed at risk, as well as cohorts of very young, previously unexposed children who are susceptible to infec-

(continued on page 12)

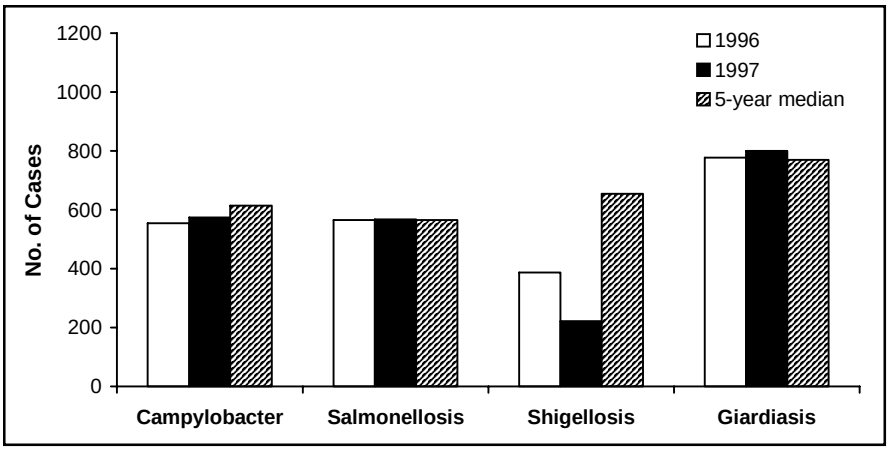


Figure 3. Reported campylobacter, salmonellosis, shigellosis and giardiasis cases, Missouri, 1996, 1997 and five-year median.

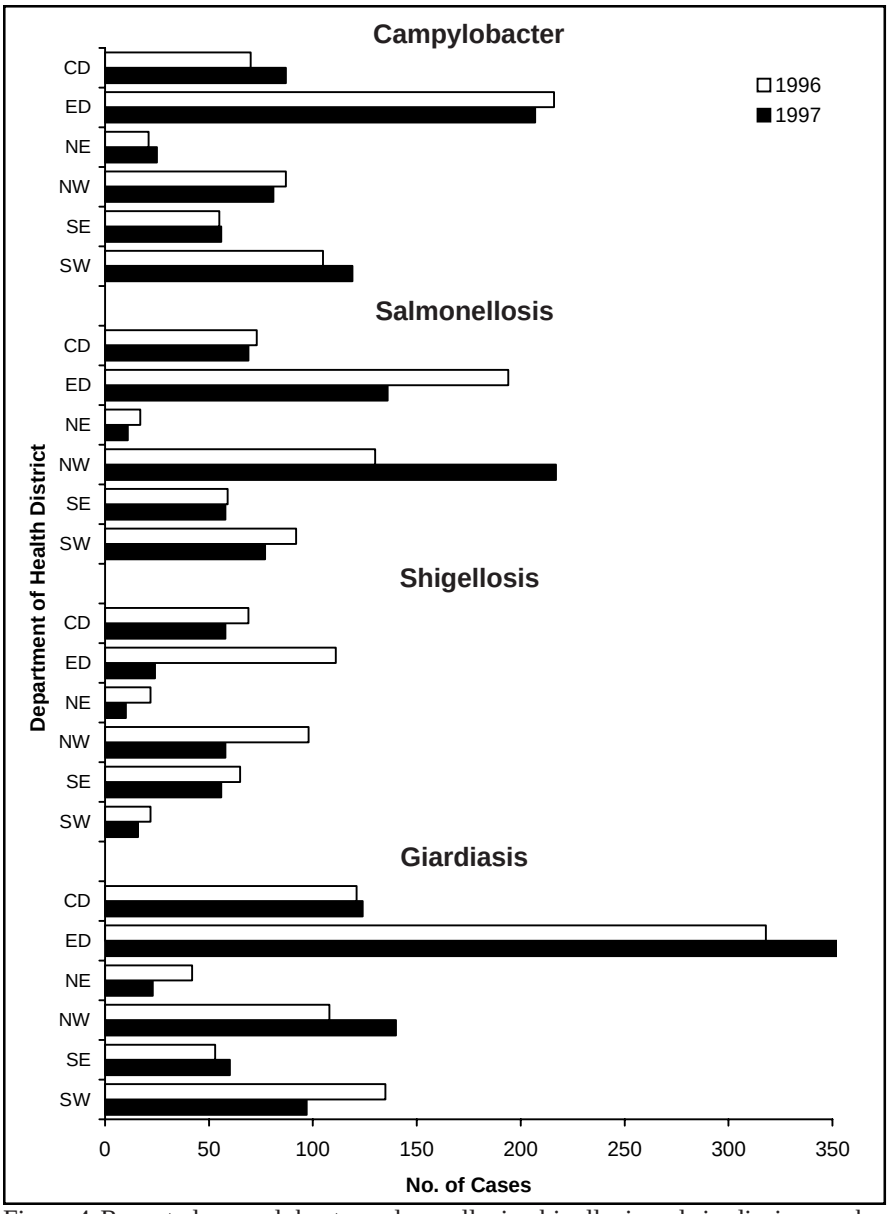


Figure 4. Reported campylobacter, salmonellosis, shigellosis and giardiasis cases by Department of Health districts, Missouri, 1996 and 1997.

(continued from page 11)
tion.[2] The most common species implicated in outbreaks in the United States is *S. sonnei*. All health districts demonstrated a reduction in the number of cases of shigellosis from 1996 to 1997. The largest reduction (78.4%) was seen in the Eastern Health District and the second largest reduction (41.8%) occurred in the Northwestern Health District. See Figure 4.

Parasites

Giardiasis increased slightly (3.0%) from 777 cases in 1996 to 800 cases in 1997. The cases for 1997 were 3.9 percent above the five-year median of 770 cases. See Figure 3. Cases increased in the Central, Eastern, Northwestern and Southeastern health districts, but decreased in the Northeastern and Southwestern health districts during 1997. The largest increase (29.6%) was noted in the Northwestern Health District while the largest decrease (28.1%) occurred in the Southwestern Health District. See Figure 4.

Viral Hepatitis

Overall, cases of hepatitis A in the state of Missouri decreased by 18.6 percent from 1,414 in 1996 to 1,151 in 1997. The 1997 total was 18.6 percent below the five-year median of 1,414 cases. See Figure 5. The Southwestern Health District reported the largest number of cases (524), representing 45.5 percent of the state's total. This was a decrease of 16.7 percent for this district from the 629 cases reported in 1996. A large decrease of 46.9 percent was seen in the Eastern Health District, where cases dropped from 262 in 1996 to 139 in 1997. An increase of 40.0 percent was observed in the Northeastern Health District with cases rising from 35 in 1996 to 49 in 1997. All health districts except the Northeastern Health District showed a decrease or no change from the preceding year. See Figure 6.

Hepatitis B increased statewide by 10.4 percent, from 326 cases in 1996 to 360 cases in 1997. The 1997 total was 32.7 percent lower than the five-year median of 535 cases. See Figure 5. The largest increases were observed in the Central (75.0%), Northwestern (51.3%) and Southwestern (38.8%) health districts. A decrease of 17.6 percent was noted in the Eastern Health District. See Figure 6.

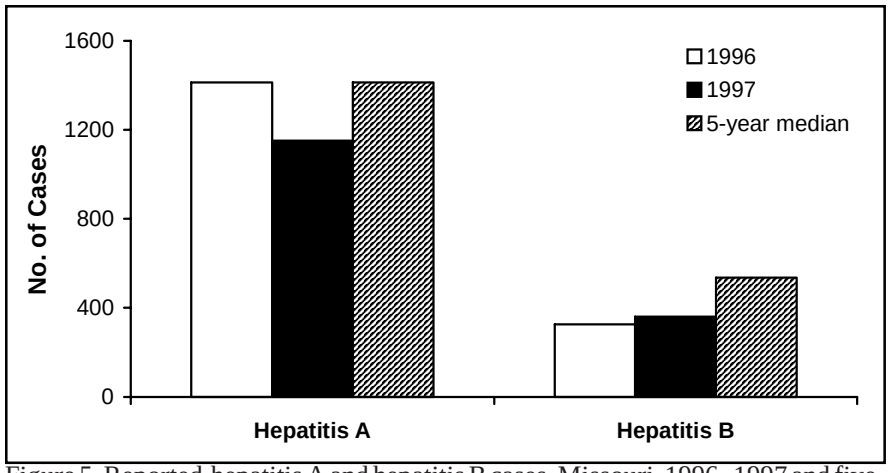


Figure 5. Reported hepatitis A and hepatitis B cases, Missouri, 1996, 1997 and five-year median.

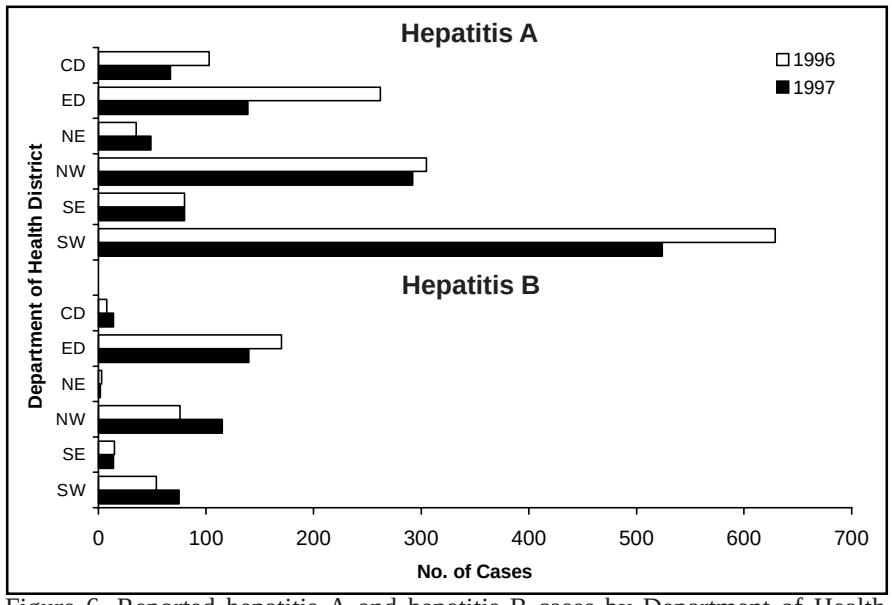


Figure 6. Reported hepatitis A and hepatitis B cases by Department of Health districts, Missouri, 1996 and 1997.

Meningococcal Disease

Invasive meningococcal disease caused by *Neisseria meningitidis* recovered from a normally sterile site is reportable in Missouri. The reported conditions may include bacteremia, septicemia, and others as well as meningitis. Before 1994, meningococcal meningitis was the only reportable condition for infection with this organism. The number of meningococcal meningitis cases increased statewide from 1992 through 1996 (31 cases in 1992, 34 in 1993, 43 in 1994, 54 in 1995 and 57 in 1996). In 1997, the reported total of 43 cases was 24.6 percent below the 1996 total and was equal to the five-year median. See Figure 7. The Northeastern and Southwestern health districts reported increases in meningococcal meningitis in 1997. The Central, Eastern and

Northwestern health districts reported decreases in the number of cases. The Southeastern Health District reported no change in the number of cases. See Figure 8. Most of the meningococcal meningitis cases were reported from large metropolitan areas in the Eastern (19 cases), Northwestern (7 cases) and Southwestern (8 cases) health districts.

Since becoming reportable in 1994, the number of invasive meningococcal disease cases other than meningitis increased annually except for one year (35 cases in 1994, 22 in 1995, 41 in 1996 and 63 in 1997). The 1997 total represented a 53.7 percent increase over the preceding year. There is not yet a five-year median for other invasive meningococcal disease. See Figure 7. The Central, Eastern, Northeastern, Northwestern and Southwestern health districts reported increases in the number of cases in 1997. The Southeastern Health District reported a 58.3 percent decrease from 12 cases in 1996 to 5 in 1997. See Figure 8. The most cases again occurred in large metropolitan areas in the Eastern (22 cases), Northwestern (15 cases) and Southwestern (9 cases) health districts. The Northwestern Health District reported a 400 percent increase from 3 to 15 cases. The 1996 and 1997 comparison indicates increased disease and/or better reporting in older individuals.

Aseptic Meningitis

Aseptic meningitis can be caused by any of a large number of agents (mostly viral). While individual cases are reportable, physicians should particularly report clusters or outbreaks of this disease because of the need to determine the causative organisms and transmission modes. Aseptic meningitis decreased by 17.5 percent from 120 in 1996 to 99 in 1997. The 1997 statewide total was 58.6 percent lower than the five-year median of 239 cases. See Figure 7. Decreases were seen in all districts except the Eastern and Northeastern health districts. See Figure 8.

(continued on page 16)

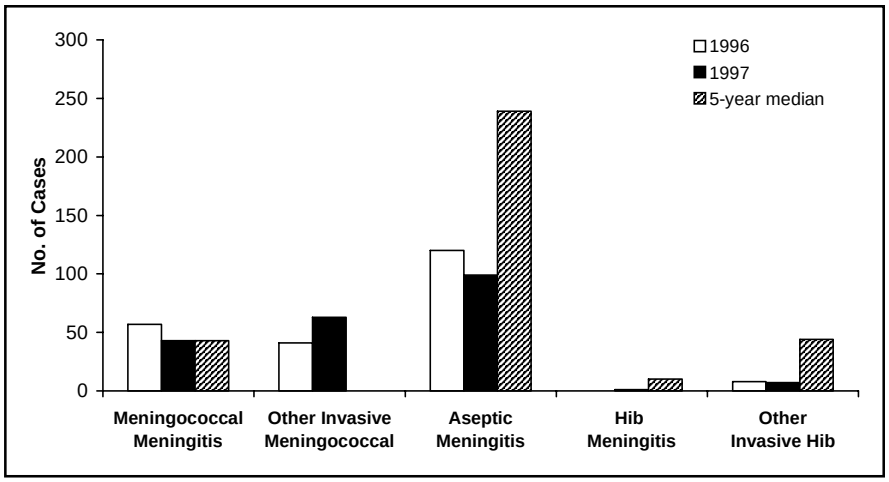


Figure 7. Reported meningitis and other invasive disease, Missouri, 1996, 1997 and five-year median.

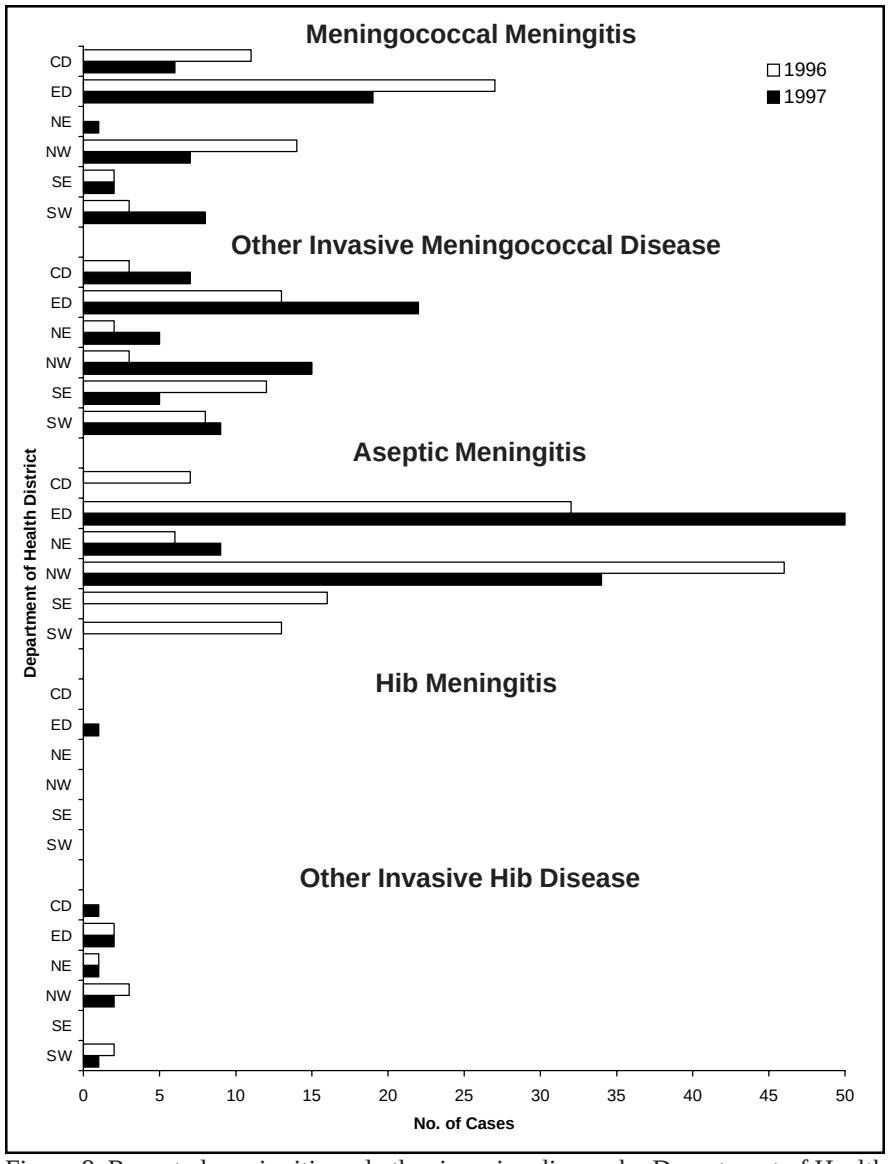


Figure 8. Reported meningitis and other invasive disease by Department of Health districts, Missouri, 1996 and 1997.

Hazardous Substances Emergency Events Surveillance 1997 Annual Report

Carol Braun
Office of Surveillance

The Hazardous Substances Emergency Events Surveillance (HSEES) system, established by the federal Agency for Toxic Substances and Disease Registry (ATSDR) in 1990, collects information on the direct public health impact of emergency events involving hazardous substances. Missouri's HSEES program has completed its fourth year of data collection. As the program continues, new notification sources are explored and information is shared and analyzed to determine the public health impact of emergency events involving the release of hazardous substances in the state.

All Missouri HSEES data are transmitted to ATSDR for analysis with the data collected from the other 13 participating states. Personal/company identifiers are not transmitted to or maintained by ATSDR to protect the confidentiality of program participants.

Because the intent of the HSEES program is to reduce the morbidity and mortality related to hazardous substances emergency events, it is important that the public, emergency responders, employees and industries receive feedback from the program concerning case investigations. In those cases where development of intervention strategies might prevent similar future incidents, specific summary investigation reports are prepared and distributed to the community involved. When appropriate, health education programs to promote prevention strategies are conducted for the affected industry, local emergency planning committees, emergency responders, etc.

This report was supported by funds from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) trust fund provided to the Missouri Department of Health under Cooperative Agreement Number U61/ATU780955-02 from the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services.

Case Definition for Hazardous Substance Release

A hazardous substance release is entered in the HSEES system if it meets the following criteria:

1. An uncontrolled or illegal release or threatened release of one or more hazardous substances; and
2. The substances that are actually released or threatened to be released include ALL hazardous substances except petroleum products; and
3. The quantity of the hazardous substances that are released, or are threatened to be released, need (or would need) to be removed, cleaned up, or neutralized according to federal, state or local law; or
4. Only a threatened release of hazardous substances exists, but this threat leads to an action such as an evacuation that can potentially impact on the health of employees, responders or the general public. This action makes the event eligible for inclusion into the surveillance system even though the hazardous substances are not released.

Analysis of Data on Hazardous Substances Emergency Events

In calendar year 1997, a total of 2,272 potential environmental emergencies were reported to the HSEES office. Of this total, 1,680 (73.9%) were environmental emergency response reports received from the Missouri Department of Natural Resources' Environmental Services Program. The United States Coast Guard's National Response Center provided 573 (25.2%) reports, the Missouri Highway Patrol sent 17 (0.7%) notifications, and there was one (<1%) report each from the Missouri Department of Health and the media. Of the 2,272 reports received, 183 (8.1%) were considered to be hazardous substance releases (see sidebar) and were entered into the HSEES database for follow-up.

Of the 183 events classified as hazardous substance releases, 169 (92.3%) involved the release of only one hazardous substance. The most commonly released substance was ammonia, occurring in 22 events. Other commonly released substances and number of occurrences were PCBs (11), pesticides (9), paint (6) and chlorine (5).

Events were scattered throughout the state, occurring in 54 counties and the City of St. Louis. This represents 47% of the counties in the state. Events occurred primarily in counties where there are larger cities, interstate highways and large manufacturing or mining facilities. See Figure 1 for the number of events occurring in each county.

One hundred thirteen (61.7%) of the releases occurred in fixed facilities while 70 releases (38.3%) were transportation-related. Of the 70 transportation releases, 55 (78.6%) were ground transportation, 12 (17.1%) were rail transportation and three (4.3%) were pipeline.

Of the 183 events, 150 (82.0%) occurred on weekdays and 33 (18.0%) occurred on weekends. One hundred thirty events (71.0%) occurred between 6 a.m. and 6 p.m., with 99 (54.1%) occurring between the core working hours of 8 a.m. and 5 p.m. Fourteen events (7.7%) occurred between 12:01 a.m. and 5:59 a.m., and 24 (13.1%) occurred between 6:01 p.m. and 11:59 p.m. Time of event was unknown for 15 (8.2%) events.

Evacuations were ordered by an official in 17 (9.3%) events. Ten evacuations involved a total of 1,553 people. The number of people evacuated in seven events is unknown. Eleven evacuations involved a building or an affected part of a building, four evacuations were within a specified radius of a release, and two evacuations were downwind.

Thirteen (7.1%) releases involving 12 different substances resulted in 23 persons with single or multiple injuries (41 total injuries). The largest number of victims associated with a release was five. The most common types of injuries reported were nausea/vomiting (6), headache (6), trauma (5), and eye irritation (5). Injuries experienced also included chemical burns, skin irritation, thermal burns, and respiratory irritation. See Figure 2.

Of the 23 victims, nine were employees, seven were members of the general public, two were policemen, two were professional fire fighters, two were volunteer fire fighters and one victim's occupation is unknown.

Six persons were treated at the scene of the event, seven were admitted to a hospital, six were treated at but not admitted to a hospital, three were transported to a hospital for observation but received no treatment, and one person died. The death occurred in a transportation-related event, and it was determined that the death was attributable to the trauma of the accident, which involved the release of 40,000 pounds of acetone. A traffic accident was the event with the largest number of victims (5) who suffered a total of 11

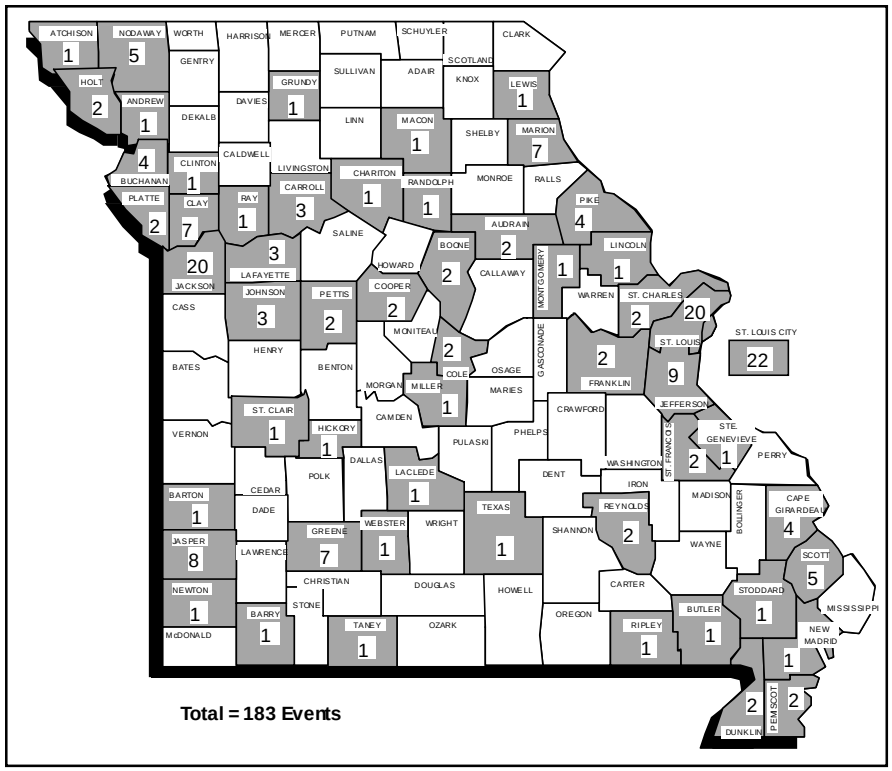


Figure 1. Location of non-petroleum hazardous substances emergency events by county, Missouri, 1997.

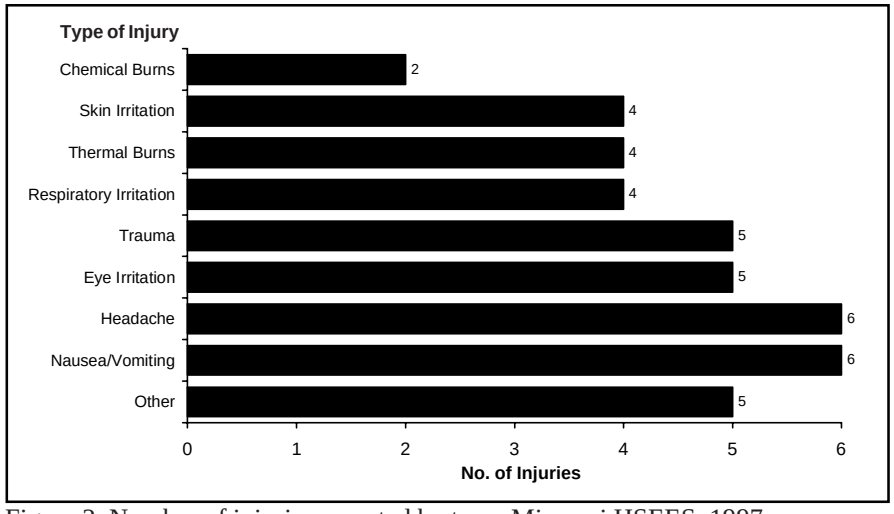


Figure 2. Number of injuries reported by type, Missouri HSEES, 1997.

injuries. In this accident, a car with four passengers from the general public struck a pickup truck transporting a pesticide used for spraying roadside vegetation. The driver of the truck was an employee. The actual amount of pesticide released was unknown. Injuries included trauma, nausea, headache, cuts and bruises. In a separate incident involving the release of pesticide, one person was injured, making events involving pesticides the number one injury-related category for the year. In another event, a cylinder containing methyl bromide was found by a construction crew when tearing down an abandoned building. When a valve on the cylinder was opened by the investigating responders, two volunteer fire fighters, a police officer, and a member of the public experienced eight injuries, including nausea, skin irritation,

(continued on page 16)

(continued from page 15)
and headache. A combination of formaldehyde and potassium hydroxide caused five injuries to three victims in one event. One event involving chlorine caused two injuries to two victims. The remaining hazardous substance releases associated with injuries involved one victim each. See Figure 3.

Reporting Events

The Missouri HSEES program is indebted to the Missouri Department of Natural Resources' Environmental Services Program for helping to investigate these hazardous substances emergency events. The program relies heavily on this unit for notification of releases and frequently contacts them for circumstances surrounding a release.

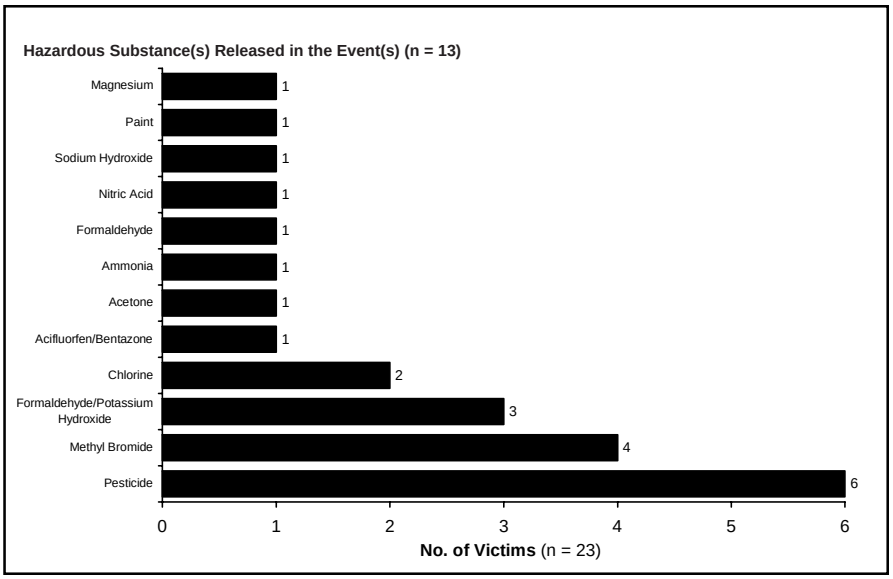


Figure 3. Number of victims by hazardous substance released, Missouri HSEES, 1997.

If you are aware of an emergency event involving the release of non-petroleum, hazardous substances that may not have been reported to the Missouri Department of Natural Resources, please contact: Carol Braun, HSEES Coordinator, Missouri Department of Health, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-9071.

Communicable Disease Control 1997

(continued from page 13)

Haemophilus influenzae type b (Hib) Disease

One case of Hib meningitis in a 1-year-old boy was reported in Missouri (Eastern Health District) during 1997. No cases were reported in 1996, while 1995 had ten cases (6 in children and 4 in adults) and 1996 had seven cases (4 in children and 3 in adults). The five-year median value for this disease is ten cases. See Figure 7 on page 13.

Reported cases of invasive Hib disease other than meningitis decreased by 12.5 percent from eight (2 in children and 6 in adults) in 1996 to seven (2 in children and 5 in adults) in 1997. Invasive Hib disease other than meningitis was 84.1 percent below the five-year median of 44 cases. See Figure 7. The Southeastern Health District had no cases; each of the other health districts had one or two cases. See Figure 8 on page 13. Cases of invasive Hib disease other than meningitis have steadily decreased since 1993.

Table 1. Most common reported *Salmonella* serotypes, Missouri, 1996 and 1997

	1996			1997		
	Serotype	No. of Cases	Percent	Serotype	No. of Cases	Percent
1.	*S. typhimurium*	134	23.7%	*S. typhimurium*	105	18.5%
2.	*S. enteritidis*	64	11.3%	*S. agona*	84	14.8%
3.	*S. braenderup*	46	8.1%	*S. enteritidis*	35	6.2%
4.	*S. newport*	36	6.4%	*S. montevideo*	27	4.8%
5.	*S. heidelberg*	23	4.1%	*S. heidelberg*	23	4.0%
6.	*S. javiana*	12	2.1%	*S. infantis*	20	3.5%
7.	*S. infantis*	11	1.9%	*S. newport*	17	3.0%
8.	*S. oranienburg*	10	1.8%	*S. hadar*	11	1.8%
9.	*S. poona*	10	1.8%	*S. thompson*	9	1.6%
10.	*S. agona*	8	1.4%	*S. anatum*	8	1.4%
11.	*S. thompson*	8	1.4%	*S. poona*	8	1.4%
				S. 4,5:1:-monophasic	8	1.4%
	All Others	203	36.0%	All Others	213	37.5%
	Total	**565**	**100.0%**	**Total**	**568**	**100.0%**

REFERENCES:

1. Centers for Disease Control and Prevention. *E coli* O157:H7–what the clinical microbiologist should know. Atlanta, GA: US Department of Health and Human Services, Public Health Service, March 1994.
2. Lee LA, Shapiro CN, Hargrett-Bean N, et al. Hyperendemic shigellosis in the United States: A review of surveillance data for 1967–1988. J Infect Dis 1991;164:894–900.

Vaccine-Preventable Disease 1997 Annual Report

Susan Denny
Section of Vaccine Preventable and Tuberculosis Disease Elimination

The incidence of almost all vaccine-preventable diseases in Missouri has continued to decline. Safe, effective vaccines have played the major role in this reduction. The mission of the section is to ensure that these vaccines are widely distributed in order to prevent, control and eliminate vaccine-preventable diseases. As the incidence of these diseases decreases, collection and reporting of complete and accurate information on remaining cases is increasingly important. By analyzing information obtained on these cases, it will be possible to gain a better understanding of the factors that allow disease transmission despite high immunization rates.

"The occurrence of vaccine-preventable diseases in a community may be a sentinel event that signals the presence of an un- or underimmunized population within the community. Such populations may be small, access health care infrequently, or otherwise be difficult to identify. As disease incidence continues to decrease in this country, continued reductions will require better understanding of the factors that allow vaccine-preventable diseases to continue to occur."[1]

Complete and accurate reporting by all health care providers is essential in order to acquire that understanding. The Bureau of Immunization is responsible for surveillance of pertussis, diphtheria, tetanus, measles, mumps, poliomyelitis and rubella, as well as *Haemophilus influenzae* type b in children under age 15. Surveillance of three other vaccine-preventable diseases, hepatitis A, hepatitis B and *Haemophilus influenzae* type b in adults, is conducted by the Bureau of Communicable Disease Control. Information on the incidence of those diseases can be found in the Bureau of Communicable Disease Control 1997 Annual Report found on pages 10–13 and 16 of this issue.

In 1997, there were no reported cases of diphtheria, tetanus, polio or mumps in Missouri. There was one case of measles in a 4-year-old boy who had been previously immunized; one case of *Haemophilus influenzae* type b in a 1-year-old boy; and two cases of rubella, one in a 19-month-old girl and another in a 28-year-old man, both of whom had been previously immunized.

In 1997, 80 cases of pertussis were reported in Missouri, compared to 74 cases in 1996 and 63 in 1995. Pertussis was a complication associated with AIDS in the death of one infant. The majority (76%) of the pertussis cases were in children less than 1 year of age, 12 percent were in children between the ages of 1 and 5, and the remaining cases were in children between the ages of 5 and 14.

Incomplete immunization coverage is not the only reason that cases of pertussis continue to occur. The Advisory Council on Immunization Practices recommends an optimum of five doses of pertussis vaccine for children through age 6. But even if a person is fully immunized by age 7, immunity eventually wanes. However, it is not recommended that persons over age 7 receive routine pertussis vaccination because adverse reactions to the vaccine are thought to be more frequent, and pertussis-associated morbidity and mortality decrease with age.

The Department of Health is working with both public and private health care providers to appropriately immunize 90 percent of Missouri's 2-year-olds. As the department works toward this goal, good surveillance data will greatly enhance its ability to identify individuals and communities in which immunization rates need to be improved.

REFERENCE:

1. Wharton M. Disease Reduction Goals. Manual for the Surveillance of Vaccine-Preventable Disease. Atlanta, Ga: National Immunization Program, Centers for Disease Control and Prevention, 1997:1–5.

Tuberculosis in 1997

(continued from page 3)
of active disease patients were placed on the four-drug regimen. This improved to 67.9 percent in 1996 and to 75.0 percent in 1997. However, much work remains in order to reach 100 percent compliance.

Directly observed therapy (DOT) has been adopted as the standard of care in Missouri. Our emphasis is on placing all active disease patients on DOT to ensure that treatment is completed. In areas where there are few active disease cases, steps should be taken to put patients with tuberculosis infection on directly observed preventive therapy (DOPT). These strategies involve watching people swallow their pills. Our first priority is to motivate people to come to the local health department for DOT/DOPT. However, if this is not possible, we must go to the patient. Community volunteers can be recruited to assist the local health department in conducting DOPT. Volunteers may include family, friends, neighbors, local ministers, retired persons, pharmacists, school nurses, staff in physician offices and other individuals. In 1995, 58.4 percent of active disease patients were placed on DOT. This improved to 74.1 percent in 1996, and to 76.6 percent in 1997. However, additional efforts must be undertaken in order to reach our goal of 100 percent. This will require the commitment and creativity of all those involved.

Missouri's goal is to have no more than 175 new tuberculosis cases annually by the year 2000, and to then eliminate tuberculosis in the state by the year 2010.

State Public Health Laboratory - 1997 Annual Report

Metabolic Disease Screening

Infants screened 76,810
- Presumptive positives:
- PKU 9
- Hypothyroidism 260
- Galactosemia 36
- Sickle Cell 50
- Other hemoglobinopathies 1,414

Serology/Virology

HIV Serology 76,745
- HIV antibody positive 648

Syphilis Serology 24,873
- Sero-confirmed reactive 832

Hepatitis A Serology 1,270
- Positive 277

Hepatitis B Serology 7,663
- Positive 165

Measles, Mumps and Rubella (Diagnostic Serologies) 9,235
- Measles (IgM positive) 5
- Mumps (significant rise in titer) 0
- Rubella (IgM positive) 0
- Prenatal rubella screens 9,202
  - Nonreactive patients 1,235

Viral Isolation 1,584
- Influenza isolates 41
- Enterovirus isolates 9
- Herpes isolates 410

Rabies 2,493
- Positive specimens 37

Microbiology

Enterics 1,784
- *Salmonella* 776
- *Shigella* 182
- *Campylobacter jejuni* 19
- *E. coli* O157:H7 71

Parasitology 2,998
- Ova/parasites found 719

Reference Bacteriology 1,600
- *Francisella tularensis* 11
- *Haemophilus influenzae* 12
- *Neisseria meningitidis* 98
- *Bordetella pertussis* 99

DNA Probe for Chlamydia/Gonorrhea 104,286
- *N. gonorrhoeae* 1,419
- *Chlamydia trachomatis* 4,924

Tuberculosis 9,885
- Positive Cultures 590

Environmental Testing

Chemistry 16,719
- Blood lead samples 12,139
- Total analyses 25,394
- Blood lead ≥20 µg/dL 212
- Environmental lead samples 329

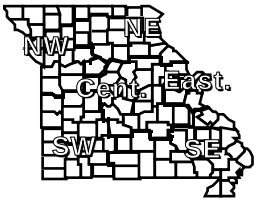
Bacteriology—Water

Private Samples 10,487
- Coliform positive 2,593

Public Supplies 59,031
- Coliform positive 1,975
- *E. coli*/fecal coliform positive 193

Swimming Pools 1,508

Food/Dairy/Beverage 3,360
- Excessive bacteria, coliform, yeast and mold 99



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention
QUARTERLY REPORT

Reporting Period *
October - December, 1997

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	3 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1997	1996	FOR 1997	FOR 1996	5 YR MEDIAN
Vaccine Preventable Dis.																
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	1	0	0	1	0	1	0	10
Hib Other Invasive	1	1	0	0	0	0		1	0	0	0	3	1	7	8	44
Influenza	3	0	0	11	3	5		1	8	6	6	43	126	270	283	272
Measles	0	0	0	0	0	0		0	0	0	0	0	0	1	3	2
Mumps	0	0	0	0	0	0		0	0	0	0	0	4	0	10	30
Pertussis	3	0	2	3	2	1		3	4	3	0	21	39	80	74	74
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	1	0	0	0		0	1	0	0	2	0	2	0	1
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	0	1	1
Viral Hepatitis																
A	75	8	23	46	43	3		12	3	8	67	288	512	1151	1414	1414
B	8	1	7	2	21	1		8	34	6	13	101	106	360	326	535
Non A - Non B	1	0	0	0	0	0		0	0	0	0	1	4	4	23	25
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	1	0	1
Meningitis																
Meningococcal	1	0	0	0	2	0		2	1	1	0	7	12	43	57	43
Enteric Infections																
Campylobacter	18	7	25	9	18	7		5	7	18	12	126	110	574	554	614
Salmonella	23	5	15	15	16	17		11	4	15	6	127	151	568	565	565
Shigella	13	1	1	9	8	0		3	1	2	0	38	75	222	387	654
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	0	1	2	2
Parasitic Infections																
Giardiasis	24	6	34	14	27	33		17	50	40	10	255	234	800	777	770
Sexually Transmitted Dis.																
AIDS	6	1	3	6	4	9	10	42	38	28	5	152	247	501	845	178
Gonorrhea	70	15	138	112	57	41		564	750	369		2116	2110	7658	8415	3211
Prim. & Sec. syphilis	0	0	0	2	0	1		1	16	7		27	38	118	221	195
Tuberculosis																
Extrapulmonary	0	0	0	1	1	0	0	2	5	4	1	14	15	47	41	12
Pulmonary	4	0	4	12	1	4	0	4	18	15	4	66	59	201	183	59
Zoonotic																
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	1	1	1
Rabies (Animal)	3	1	1	2	0	1		0	0	0	1	9	3	31	26	27
Rocky Mtn. Sp. Fever	0	0	0	0	2	0		0	0	0	0	2	6	24	19	20
Tularemia	1	2	1	0	1	0		1	0	1	0	7	0	18	9	24

TEAR OUT FOR FUTURE REFERENCE

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis - 10
Encephalitis (infectious) - 4
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 3
Legionellosis - 19
Leptospirosis
Lymphogranuloma Venereum
Malaria - 7
Plague
Rabies (human)
Reye Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 3
Trichinosis

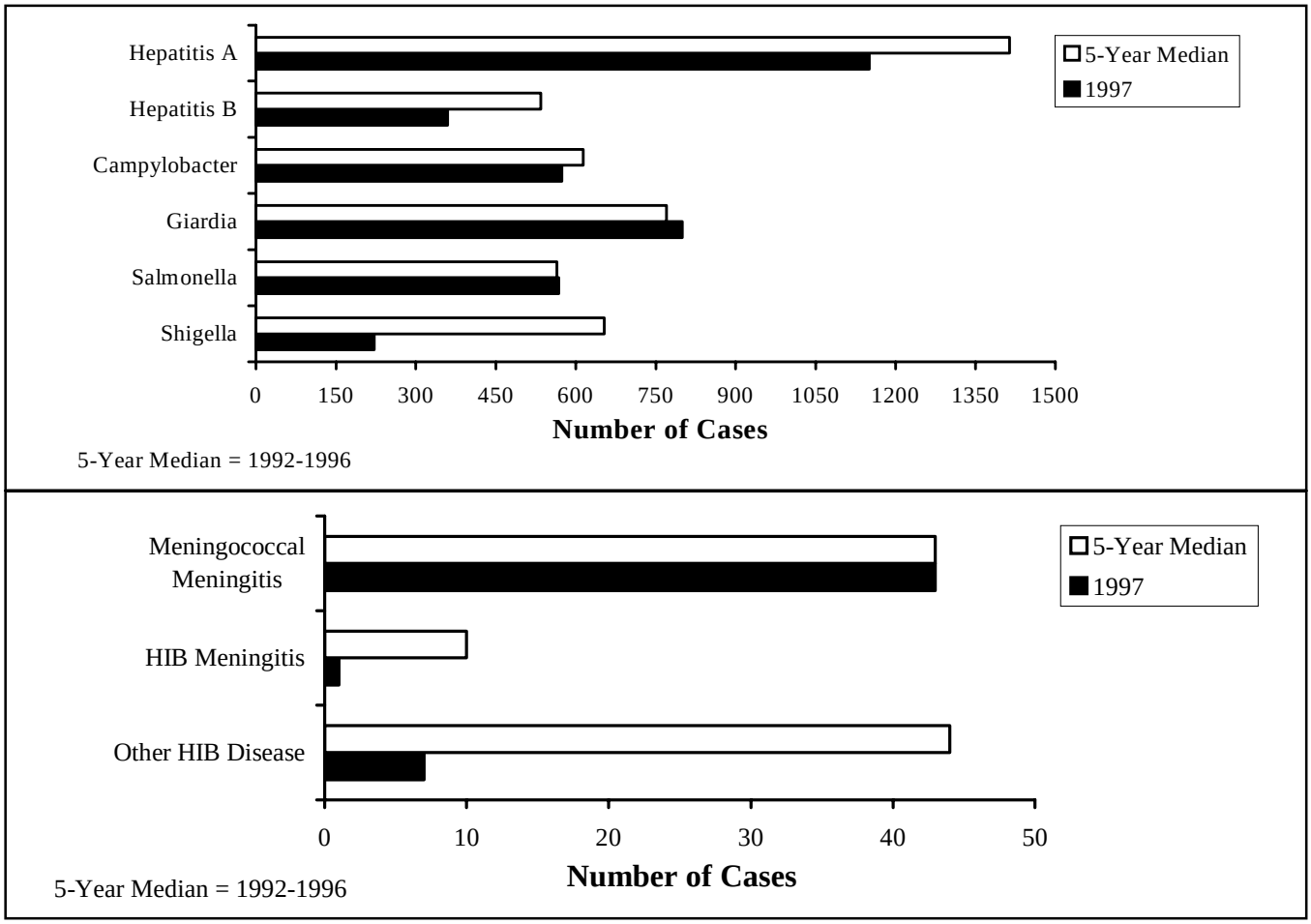
Outbreaks

Foodborne - 3
Waterborne
Nosocomial - 3
Pediculosis - 1
Scabies - 4
Other
Hepatitis A - 1
AGI - 3
Ringworm - 1

*Reporting Period Beginning September 28, 1997, Ending January 3, 1998.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.

Disease Reports, January–December 1997 and 5-Year Median



Viral Hepatitis

During the January/December 1997 time period, hepatitis A cases decreased to 1,151 cases, which is a 18.6% decline from the 1,414 cases reported in 1996. This is also a 18.6% decline from the five-year median of 1,414. The Southwestern Health District reported the largest number of cases (524), representing 45.5% of the state's total; however, this also represented a 16.7% decline from 629 cases reported in this district in 1997.

Hepatitis B showed a narrow 10.4% rise from 326 cases in 1996 to 360 cases in 1997. However, the total of 1997 cases was 32.7% lower that the five-year median of 535 cases.

Enterics

Campylobacter increased slightly by 3.6% during 1997, from 554 cases in 1996 to 574 cases in 1997. The total number of 1997 cases declined 6.5% from the five-year median of 614 cases. Salmonella increased by only 0.53% from 565 cases in 1996 to 568 in 1997. The 568 cases was also a 0.53% rise above the five-year median of 565 cases. Five of the six health districts showed reductions in salmonella cases. However, the cases in the Northwestern Health District rose by 67.7%, largely due to a large restaurant outbreak. Shigellosis cases continue to decline from 387 cases in 1996 to 222 cases in 1997. This is a 42.6% drop. The 222 cases in also a remarkable 66% decline from the five-year median of 654 cases.

Parasites

Giardiasis continued to show incremental increases from 777 cases in 1996 to 800 cases in 1997, a 3% increase. This is also a slight 3.9% increase above the five-year median of 770 cases.

Meningitis

Meningococcal meningitis cases numbered 43 in 1997, equalling the five-year median of 43 cases. This was a 24.6% decrease from 57 cases in 1996.

HIB Disease

Following no cases reported in 1996, one case of *Haemophilus influenzae* type b (Hib) meningitis was reported in Missouri during 1997. The five-year median is 10 cases. The steady decline perhaps represents an effective Missouri Hib vaccination program in the child population. Other invasive cases (non-meningitis) of *Haemophilus influenzae* that may not be affected by the vaccine fell to 7 cases in 1997 from 8 cases in 1996, a 12.5% decline. The 7 cases of other invasive Hib disease reflected a marked decline of 84.1% percent from the five-year median of 44 cases.

Sexually Transmitted Diseases and HIV in Missouri: 1997

Kurt M. Kleier
Howard L. Pue, D.V.M., M.S.
Office of Surveillance

Mary M. Hayes
Bureau of STD/HIV Prevention

Robert H. Hamm, M.D., M.P.H.
Office of Epidemiology

1997 Highlights

- ✔ **Reductions in AIDS Incidence and Death**
- ✔ **Collaborations Between Public/Private Partners, Academia**
- ✔ **Syphilis Outbreak Management**
- ✔ **Continued Statewide Declines in P&S Syphilis**
- ✔ **Missouri Syphilis Epidemic Evaluation Project**
- ✔ **Compliance With Ryan White Care Act Requirements**

Over the past five years, Missouri has developed the capacity to effectively respond to the threat of syphilis, gonorrhea, chlamydia and HIV, and to conduct statewide community planning for sexually transmitted diseases (STD) and human immunodeficiency virus (HIV) prevention. State and federal contributions to overall STD/HIV prevention efforts have increased to reflect the epidemics; yet, these resources have not been sufficient to accommodate the elimination of syphilis in addition to prevention efforts for hepatitis B, human papillomavirus (HPV) and genital herpes. STDs and HIV continue to plague Missourians at alarming rates, particularly among African Americans and youth.

Prevention planning, programming and public health resources remain crucial if Missouri is to achieve the elimination of syphilis and significant decreases in gonorrhea, chlamydia and HIV. Missouri continues directing efforts toward the control and eventual eradication of early syphilis (primary, secondary and early latent). Renewed effort is being placed on the control and prevention of both chlamydia and gonorrhea, with special emphasis on youth and young adult populations. Efforts continue to provide a full range of prevention and intervention services for HIV infection through enhanced collaboration with HIV/AIDS Care and tuberculosis control programs. Through disease intervention and prevention activities, Missouri citizens, families, and communities have a reduced risk from the health threat of STD/HIV infections.

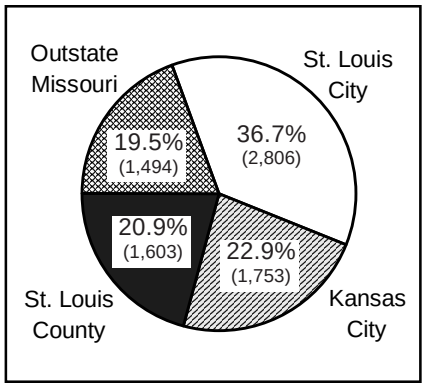


Figure 1. Reported gonorrhea cases by geographic area, Missouri, 1997.

Gonorrhea

In 1997, reported cases of sexually transmitted *Neisseria gonorrhoeae* in Missouri decreased by 9.0 percent from 8,414 cases in 1996 to 7,656 cases in 1997. This represents the ninth consecutive year that reported cases have declined statewide. Figure 1 shows the geographic distribution of gonorrhea cases in 1997. Eighty-four of Missouri's 114 counties reported at least one case of gonorrhea. Each region showed decreases in reported cases from 1996 to 1997: Kansas City, 27.0 percent; St. Louis City, 2.9 percent; Outstate Missouri, 1.5 percent, St. Louis County, 0.7 percent. Missouri Infertility Prevention Project screening efforts detected 18.4 percent (1,408 cases) of all statewide reported sexually transmitted gonorrhea cases.

African Americans and youth continue to be disproportionately impacted among reported gonorrhea cases. African Americans represent 5,423 (70.8%) of the 7,656 reported cases, with a corresponding rate of 989.2 per 100,000 population.* Whites represent 741 reported cases (9.7%) for a rate of 16.5. Young people under 25 made up 64.2% of total reported gonorrhea cases in 1997. See Table 1 and Figure 2.

Missouri's decrease in reported gonorrhea cases parallels an overall national trend. However, Missouri's gonorrhea rate continues to be higher than the national average. In 1996, the rate of gonorrhea cases in Missouri (164.4) was 1.3 times the national rate (124.0).** Additionally, in 1996, St. Louis City ranked fifth nationally with a gonorrhea case rate of 805.7 (2,890 cases).

In an attempt to address high rates of gonorrhea, St. Louis was one of seven sites funded by the Centers for Disease Control and Prevention (CDC) to promote health-seeking behaviors of people at risk for gonorrhea and to improve health care services. "Health-seeking" behaviors include recognizing symptoms, going to a doctor or clinic for care, and completing medication

(continued on page 22)

* All rates in this article are per 100,000 population.
** Throughout this report, 1996 is the most recent year for which national data are available for STD- and HIV-related conditions.

(continued from page 21)

regimens. Rather than focusing on intervening in the spread of disease (referred to as *primary* prevention), this project focuses on reducing the incidence of gonorrhea by promoting early detection and prompt, effective treatment (*secondary* prevention). Improving health-seeking behaviors and health care delivery will decrease the time individuals are infectious, thus potentially reducing overall transmission rates. Consequences of untreated gonorrhea include infertility and childbirth complications.

Two interventions (or educational programs) will be designed, implemented, and subsequently evaluated. One intervention will be at the community level, aimed at promoting better health seeking behaviors and will involve numerous local agencies and community-based organizations such as homeless shelters, drug treatment centers, churches and recreation centers. Another intervention will target health care providers to promote better provision of health care services. The Missouri Department of Health is also a partner in the Gonococcal Community Action Project (GCAP). GCAP is designed to conduct outreach urine sampling for gonorrhea and chlamydia in high risk populations in St. Louis (see Chlamydia section on page 23).

Table 1. Gonorrhea, Chlamydia and Early Syphilis Cases by Gender, Race, Age Group and Geographic Area, Missouri, 1997.

	GONORRHEA		CHLAMYDIA		EARLY SYPHILIS	
GENDER						
MALES	3,544	46.3%	1,504	12.3%	155	48.4%
FEMALES	4,112	53.7%	10,743	87.7%	165	51.6%
RACE						
WHITE	741	9.7%	3,273	26.7%	37	11.6%
BLACK	5,423	70.8%	4,880	39.8%	276	86.3%
ASIAN	9	0.1%	32	0.3%	0	0.0%
INDIAN	8	0.1%	12	0.1%	1	0.3%
OTHER	43	.6%	23	0.2%	0	0.0%
UNKNOWN	1,432	18.7%	4,027	32.9%	6	1.9%
RACE AND GENDER						
WHITE MALES	200	2.6%	357	2.9%	14	4.4%
BLACK MALES	2,916	38.1%	707	5.8%	137	42.8%
ASIAN MALES	5	0.1%	5	0.0%	0	0.0%
INDIAN MALES	1	0.0%	0	0.0%	1	0.3%
OTHER MALES	19	0.2%	4	0.0%	0	0.0%
UNKNOWN MALES	403	5.3%	431	3.5%	3	0.9%
WHITE FEMALES	541	7.1%	2,916	23.8%	23	7.2%
BLACK FEMALES	2,507	32.7%	4,173	34.1%	139	43.4%
ASIAN FEMALES	4	0.1%	27	0.2%	0	0.0%
INDIAN FEMALES	7	0.1%	12	0.1%	0	0.0%
OTHER FEMALES	24	0.3%	3,596	29.4%	0	0.0%
UNKNOWN FEMALES	1,029	13.4%	19	0.2%	3	0.9%
AGE GROUP						
<10	12	0.2%	13	0.1%	0	0.0%
10–14	133	1.7%	291	2.4%	0	0.0%
15–19	2,526	33.0%	5,649	46.1%	24	7.5%
20–24	2,244	29.3%	4,079	33.3%	68	21.3%
25–29	1,091	14.3%	1,240	10.1%	66	20.6%
30–34	662	8.6%	492	4.0%	57	17.8%
35–39	468	6.1%	207	1.7%	38	11.9%
40+	476	6.2%	137	1.1%	67	20.9%
UNKNOWN	44	0.6%	139	1.1%	0	0.0%
GEOGRAPHIC AREA						
OUTSTATE	1,494	19.5%	4,744	38.7%	93	29.1%
KANSAS CITY	1,753	22.9%	2,657	21.7%	8	2.5%
ST. LOUIS CITY	2,806	36.7%	2,651	21.6%	147	45.9%
ST. LOUIS COUNTY	1,603	20.9%	2,195	17.9%	72	22.5%
TOTAL	**7,656**		**12,247**		**320**	

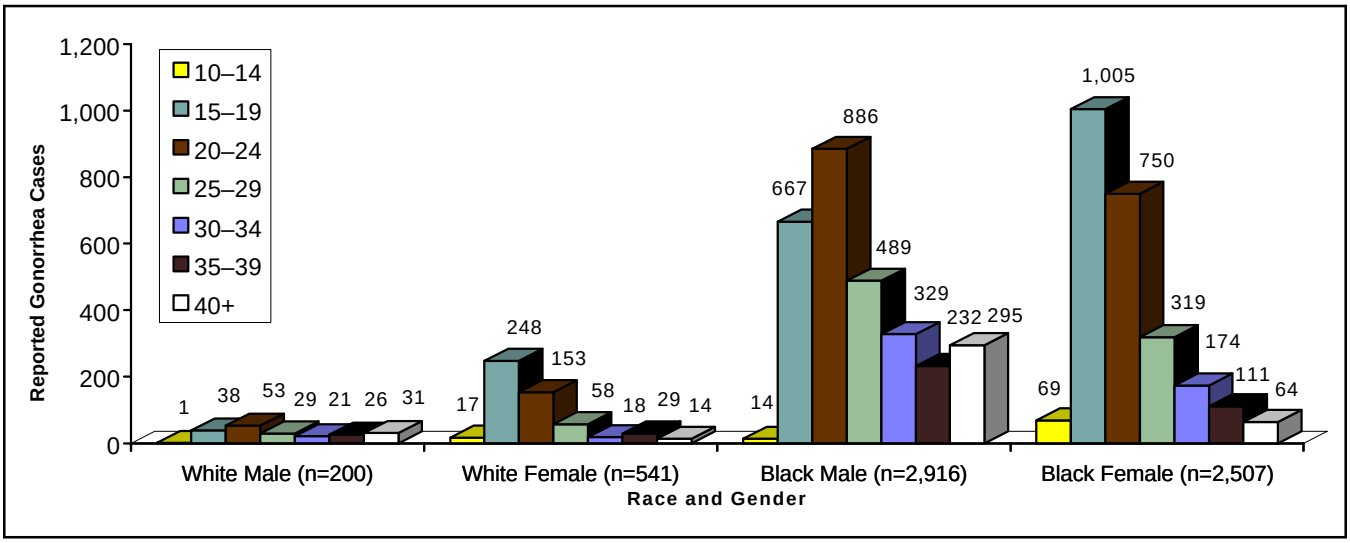


Figure 2. Reported gonorrhea cases by race, gender and age group, Missouri, 1997.

Chlamydia

Reported cases of sexually transmitted *Chlamydia trachomatis* (CT) infections in Missouri increased by 2.6 percent from 11,935 cases in 1996 to ,12,247 cases in 1997. All areas of the state experienced 7.8 percent to 11.7 percent increases in reported chlamydia cases except Kansas City, which reported 1.2 percent fewer cases in 1997 than in 1996.

The Missouri Infertility Prevention Project (MIPP) is an active participant in the Region VII Chlamydia Control Project (CCP), a national surveillance project to prevent STD-related infertility. MIPP is a partnership between the Missouri Department of Health and the Missouri Family Health Council, Missouri's lead Title X/family planning agency. In 1997, the MIPP screened 108,000 individuals for CT infection and reported an overall positivity rate of 4.2 percent, down from 5.1 percent in 1996. In 1997, 40.2 percent (4,920 cases) of statewide sexually transmitted CT infections were reported through MIPP screening activities. As a result of the MIPP, chlamydia screening has expanded. High-risk targeted populations for chlamydia testing are women less than 25 years of age, especially those between 15 and 19. Given the apparent plateauing of chlamydia cases over the past two years since MIPP inception, core populations at risk may have been identified. To amplify the impact of this program, MIPP activities will be gradually shifting from screening to prevention interventions.

During the course of the MIPP project, specific populations at highest risk for chlamydial infection have been identified (especially females less than 25 years of age, who have a 1997 positivity of 5.5 percent compared to 1.0 percent for women 25 years of age and older). Given that MIPP screening efforts will be most effective when focused on high-risk populations, the project has modified its screening criteria to include all women in enrolled clinics under the age of 25. The criteria also called for selective screening of women ages 25 and older.

In late 1997, Missouri began the Gonococcal Community Action Project (GCAP), a collaborative project in St. Louis with Washington University, Grace Hill Neighborhood Services and the St. Louis City Department of Health and Hospitals. Outcomes of GCAP are to identify underserved populations and to evaluate the acceptability of urine outreach sampling. The project is conducting outreach urine sampling for gonorrhea and chlamydia in high risk populations in St. Louis targeting six zip code areas. Preliminary results from this outreach-based screening are outlined in the sidebar.

Due to both MIPP and GCAP activities, youth, specifically females between the ages of 13–24, are disproportionately represented among reported cases of chlamydial infection. Of total cases reported statewide in 1997, 87.7 percent were in females, and 80.0 percent were less than 25 years of age. See Table 1. Since the MIPP focuses on the screening of criteria-based females, and that a majority of CT-infected males are asymptomatic and thus receive only presumptive treatment (no diagnostic testing), it can be deduced that the number of reported CT cases would be significantly higher if males were also screened.

Preliminary Results From the Gonococcal Community Action Project Screening Activities St. Louis, Missouri

Reported through January 29, 1998

Screening sample of 143 persons:

- 3.5% Gonorrhea Positive
- 8.4% Chlamydia Positive
- 2.8% Co-infected with Gonorrhea and Chlamydia
- 33% of Chlamydia Positives are also Positive for Gonorrhea

Congenital Syphilis

Reported cases of congenital syphilis remained stable from 1996 to 1997. St. Louis County reported six (50%) of the reported congenital syphilis cases, followed by St. Louis City with four (33.3%). Both Outstate Missouri and Kansas City reported one case each (8.3% of the state's total). African Americans continue to be disproportionately represented among congenital syphilis cases, comprising nine (75.0%) of the 12 cases reported in 1997.

Routine screening of pregnant women in prenatal care continues to contribute significantly to the decline in congenital syphilis cases. Access to prenatal care and/or the willingness of pregnant women to seek prenatal care are significant factors in the prevention of congenital syphilis cases. Pregnant females and newborns with positive serologies are high priority for field investigation by public health personnel. Intensive patient evaluation is provided to assure appropriate diagnosis and treatment including behavioral risk assessment, and emphasis on the importance of prenatal care and repeat syphilis serologic testing.

Of the 12 congenital syphilis cases reported in 1997, seven (58.3%) were born to mothers who had received no prenatal care. The issue of prenatal care

(continued on page 24)

(continued from page 23)

has been addressed with the St. Louis Regional Prevention Planning Group.

Early Syphilis: Primary and Secondary (P&S) and Early Latent

Missouri experienced an increase in case rates of early syphilis from 1987–93. Since that time, public health activities have been targeted toward the reduction of syphilis (85.1% decrease in early syphilis from 1993 to present). During 1997, 320 early syphilis cases were reported in Missouri residents. This represents a 33.3 percent decrease from the 480 cases reported in 1996. Of the 320 cases of early syphilis, 36.9 percent (118 cases) were in the primary and secondary stage, and 63.1 percent (202 cases) were in the early latent stage. These figures represent a 46.6 percent decline in P&S syphilis cases, and a 22.0 percent decline in early latent syphilis cases, from the 221 P&S cases and the 259 early latent cases reported in 1996. Several interventions influenced the marked decreases in early syphilis cases, including enhanced public awareness through extensive media coverage and advocacy of symptom recognition by community-based organizations, neighborhood health centers and peer-based outreach workers within targeted communities. Of additional significance was the incorporation of STD awareness and education into the regional HIV Community Planning process as well as expanding the involvement of public health counseling and intervention specialists in community planning. The St. Louis STD Task Force collaborated with the St. Louis STD/HIV Prevention Training Center at Washington University to provide physician/clinical training and education.

Syphilis rates across the state appear to be related to risk factors which include illicit drug use (especially crack cocaine use), availability of and access to health care, and socio-economic status. Target populations for syphilis intervention are African Americans, persons 15–34 years of age, drug users and their sex partners, and St. Louis residents. In 1997, the rate of syphilis in St. Louis City and County was 6.7, compared to the Missouri rate of 2.3.

Notable declines in the number of early syphilis cases were seen in all areas of the state except Outstate Missouri. St. Louis City had a 47.1 percent decrease from the 278 cases reported in 1996, St. Louis County had a 41.5 percent decrease from the 123 cases reported in 1996, and Kansas City had a 60.0 percent decrease from the 20 cases reported in 1996. See Table 1. Figure 3 shows the geographic distribution of early syphilis cases in 1997.

The only area that reported increases in early syphilis in 1997 was Outstate Missouri. In 1997, 93 cases of early syphilis were reported, representing a 57.6 percent increase from the 59 cases reported in 1996. Early latent syphilis cases in Outstate Missouri increased by 75.0 percent (from 40 to 70 cases), and P&S syphilis cases increased by 21.1 percent (from 19 to 23 cases). The Bootheel region[¶] of southeastern Missouri has been experiencing an outbreak of syphilis. During 1997, 12 cases of P&S syphilis and 33 cases of early latent syphilis were reported from this region. The Department of Health and local health officials have developed a three-part plan to address the outbreak and prevent the reoccurrence of disease. The components of the plan are described in the sidebar.

Although significant declines in early syphilis morbidity have occurred both nationally and in Missouri, the rates of early syphilis in Missouri remain unacceptably high. African Americans

Syphilis Outbreak Control Strategy for Southeast Missouri

- **Immediate Outbreak Response**
  includes investigation of syphilis cases and contacts, examination and presumptive treatment of contacts, syphilis screening in high-risk populations and education of at-risk groups and the general public
- **Meetings Between Local Health Departments and Clinical Partners**
  to improve diagnosis, treatment, reporting, follow-up and prevention of syphilis and other STDs
- **Meetings Between Public Health Officials and Community Members**
  to identify and help implement mechanisms to improve the health of the community

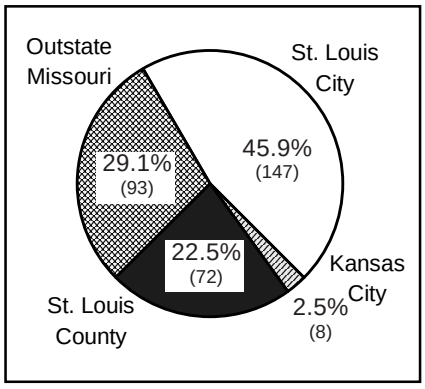


Figure 3. Reported early syphilis cases by geographic area, Missouri, 1997.

[¶]Butler, Dunklin, Mississippi, New Madrid, Pemiscot, Scott, and Stoddard Counties

continue to be disproportionately represented among 1997 P&S syphilis cases, accounting for 86.4 percent (102 cases) in contrast to whites who account for 11.9 percent (14 cases). Corresponding rates are 18.7 and 0.3, respectively.

Missouri is currently involved in a five-year study to evaluate the rise and decline of syphilis in the St. Louis area in the early 1990s, and the connection between syphilis and HIV. Dr. Bradley Stoner of Washington University is investigating the extent to which specific behavioral, social, and demographic factors contributed to syphilis and HIV acquisition during the epidemic period, and the extent to which syphilis served as a co-factor in HIV transmission. Missouri hopes to use the findings from this retrospective study to develop strategies to achieve P&S elimination and congenital syphilis eradication.

HIV Disease

Through the end of 1997, a cumulative total of 11,134 cases of HIV disease[§] have been reported in Missouri residents; 4,304 (38.7%) of these individuals are known to have died. During 1997, 950 cases of HIV disease were reported. The term HIV disease refers to the sum of all HIV and AIDS cases. HIV cases are those individuals infected with HIV who have not progressed to AIDS. If and when individuals develop a specific HIV-related illness or depressed immunologic status that causes them to meet the case definition for AIDS, they are no longer classified as an HIV case, but instead as an AIDS case.[§§] HIV cases, in general, represent individuals more recently infected with HIV compared to those with AIDS.

Precipitous Declines in AIDS Cases

Of considerable interest and remarkable achievement in 1997 was the precipitous decline in reported AIDS cases. The 480 cases reported in 1997 reflect a 41.2 percent decrease from the 816 cases reported in 1996. See Figure 4. Missouri's AIDS rates declined from 15.9 in 1996 to 9.4 in 1997. The 9.4 case rate in 1997 was lower than the national rate of 22.3.

Missouri AIDS trends parallel national trends. During 1996, 68,808 cases of AIDS were reported in the United States. During 1997, 60,634 cases of AIDS were reported, a 11.9 percent decrease. Certainly two of the contributing factors to the precipitous decline in reported AIDS cases are better combination antiretroviral therapy for HIV disease and the better use of prophylactic antibiotics to prevent HIV-related opportunistic infections.

Another contributing factor to the decrease of AIDS cases may be a possible decline in the number of new HIV infections in Missouri in recent years. There is significant concern that the effective use of better treatment regimens resulting in declining AIDS incidence and deaths may contribute to a resurgence of individuals engaging in high risk behaviors for HIV infection. In 1998, the Department of Health is collaborating with the St. Louis University School of Public Health to replicate the High Risk Testing Survey (HITS) originally conducted from November 1995 to December 1996. Missouri is conducting this study (named HITS II) along with six other states. In HITS II, Missouri will interview approximately 350 individuals from high risk venues (STD clinics, gay bars, and IDU outreach settings) to assess participants' attitudes regarding HIV prevention strategies (including testing). Results from the survey will help target appropriate prevention messages/ interventions to high risk groups.

(continued on page 26)

[§] Throughout this report, all statistics related to HIV disease exclude the cumulative 99 HIV cases and 249 AIDS cases reported in persons residing in federal correctional facilities in Missouri.

[§§] The CDC case definition for AIDS includes persons with a CD4+ lymphocyte count less than 200 cells per microliter and/or the diagnosis of at least one of approximately 30 specific opportunistic infections/malignancies.

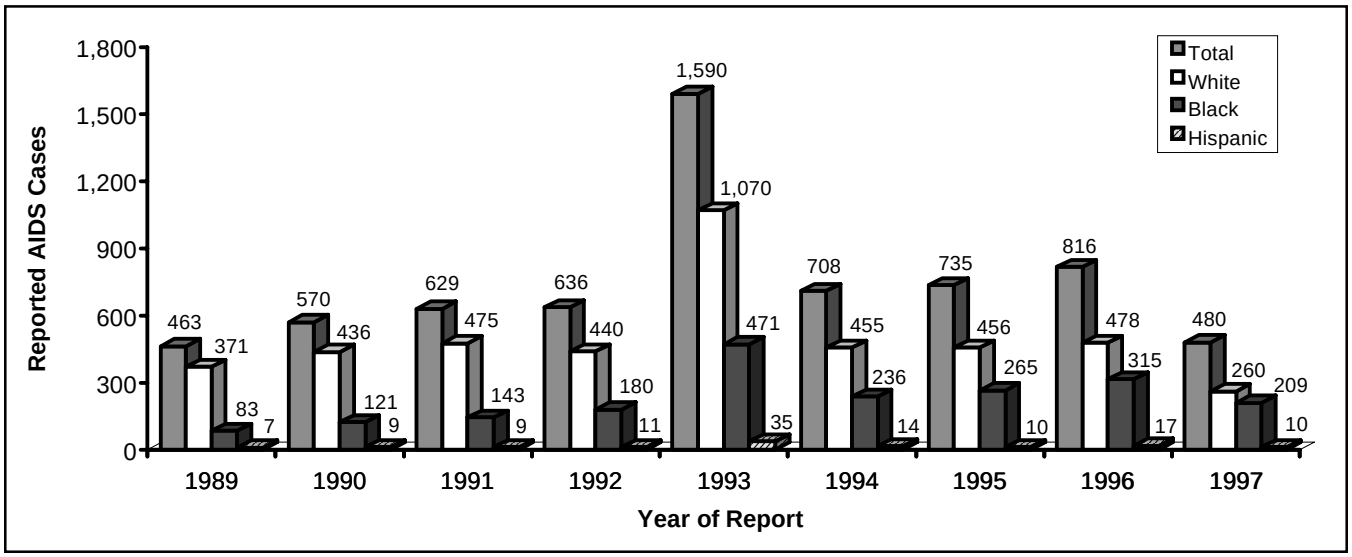


Figure 4. Reported AIDS cases by race/ethnicity and year of report, Missouri, 1989–97.

(continued from page 25)
AIDS-related deaths in Missouri have also sharply declined and parallel a national trend. The 163 AIDS-related deaths reported through death certificates in 1997[†] reflect a 51.9 percent decrease from the 339 deaths reported in 1996. During the first half of 1996, 21,460 persons died of AIDS nationwide. During the first half of 1997, 12,040 persons died of AIDS, a 43.9 percent decrease. As with the decline in AIDS cases, better treatment regimens for HIV disease and better use of prophylactic antibiotics to prevent HIV-related opportunistic infections appear to be the major contributing factors to the decline in AIDS-related deaths.

Until recent years, the number of AIDS cases provided a fairly accurate picture of the epidemic of HIV disease. The typical clinical course of an individual diagnosed with HIV infection was approximately 10–12 years. However, with treatment advances, persons with HIV infection are living longer and not progressing to AIDS as rapidly. Therefore, AIDS cases are no longer accurately characterizing the epidemic, and thus are not as useful as HIV cases in characterizing more recently infected individuals. For this reason, CDC will soon release guidelines recommending that all states adopt an HIV surveillance system. Currently, Missouri is one of only 29 states with HIV reporting (all cases of HIV infection have been reportable by name in Missouri since 1987). Missouri works closely with community planning and other prevention partners to continually incorporate HIV data into prevention planning processes.

It is estimated that there are 8,000–11,000 persons with HIV infection currently living in Missouri. These estimates suggest that, at a maximum, only about 38 percent of those living with HIV have not been diagnosed and reported. This estimate is generally consistent with CDC estimates that approximately two-thirds of persons living with HIV infection have already been confidentially tested for HIV and know their status. However, significant challenges exist to characterize the risk factors for the remainder of individuals who are infected, yet have not been tested for HIV infection and reported to public health officials.

Significant Declines in AIDS-Related Opportunistic Infections

Directly proportional to significant declines in AIDS cases and deaths is the precipitous decline in reported AIDS-related opportunistic infections (OIs). In September 1997, CDC described a six percent national decline in the number of reported OIs.[††] Most notable were declines among whites, and specifically men who have sex with men. In addition, in March 1998, the *New England Journal of Medicine*[†††] reported results of a study involving 1,255 AIDS patients. Mortality among patients declined from 29.4 per 100 person-years to 8.8 per 100 person-years in the second quarter of 1997.

HIV Disease by Gender

The substantial majority of HIV disease cases continue to be reported in males. Of the 7,434 cumulative cases of AIDS reported through 1997, 6,832 (91.9%) were males. However, females have slowly but progressively been making up a larger proportion of annually reported cases, and in 1997 comprised 13.1 percent of AIDS cases reported as compared to 12.0 percent in 1996. Females also make up a larger percentage of more recently infected individuals, comprising 21.5 percent of reported HIV cases in 1997 as compared to 20.0 percent in 1996. Based on these trends, the Department of Health has increased intervention efforts among women of childbearing age at high risk for HIV infection. These interventions include outreach HIV oral testing and health education in the three regions of highest HIV disease morbidity among women: St. Louis metropolitan area, Kansas City and Columbia.

HIV Disease by Race and Ethnicity

Whites continue to make up a majority of reported cases of HIV disease (68.6 percent of cumulative cases of AIDS and 53.6 percent of cumulative HIV cases, with white males contributing 64.8 percent of all AIDS cases and 47.1 percent of all HIV cases). However, African Americans and Latinos continue to be disproportionately represented in the epidemic. The rate for HIV disease is much higher in African Americans and Latinos. For AIDS cases reported in 1997, the rate in whites was 5.8 per 100,000; in African Americans 38.3, and in Latinos 16.2. These trends are parallel to 1997 HIV case rates (5.6, 37.8, and 16.2, respectively). Through 1997, a total of 7,082 HIV disease cases had been reported in whites. Corresponding numbers in African Americans and in Latinos were 3,741 cases and 219 cases, respectively.

In recent years through 1996, the rate of increase in annually reported AIDS cases has been noticeably higher for African Americans as compared to whites. Statewide declines in reported AIDS cases from 1996 to 1997 were not as great among African Americans as among whites. Specifically, from 1996 to 1997, the number of reported cases among whites decreased by 45.6 percent (from 478 to 260 cases), whereas among African Americans reported cases decreased 33.7 percent (from 315 to 209 cases). See Figure 4.

HIV Disease by Age Group

Among cumulative AIDS cases reported through the end of 1997, the largest percentage (45.9%) were diagnosed in persons between the ages of 30–39; the

[†] Provisional data

[††] CDC. Update: trends in AIDS incidence, deaths and prevalence—United States, 1996. MMWR 1997; 46:165–73.

[†††] Palella FJ, Delaney KM, Moorman AC, et al. Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. N Engl J Med 1998;338:853–60.

second largest percentage (23.5%) were diagnosed in persons between the ages of 20–29. Among cumulative HIV cases, the largest percentage were diagnosed between the ages of 20–29 (40.7%); the second largest percentage were diagnosed between the ages of 30–39 (37.5%).

Of AIDS cases reported in 1997, the greatest percentage (46.3%) were diagnosed in persons in the 30–39 year age group. Of total HIV cases reported in 1997, the greatest percentage (35.5%) were in the 20–29 year age group.

Taken together, these data indicate that many HIV infections are occurring in persons in their twenties, and that infections are also occurring in teenagers.

HIV Disease by Geographic Area

Missouri is divided into seven community planning regions. Members of the regional community planning groups work closely with statewide and metropolitan area surveillance staff in planning prevention and intervention activities.

The community planning regions are outlined in Figure 5, which also shows the number of cumulative AIDS cases by county. Of the 7,434 cumulative AIDS cases reported, 3,304 (44.4%) were from the three-county St. Louis Planning Region, and 2,580 (34.7%) were from the Kansas City Planning Region. These two planning regions also had the highest rates of both HIV and AIDS cases in 1997. For that year, the HIV case rates for the St. Louis and Kansas City planning regions were 14.0 and 12.1, respectively. Corresponding AIDS rates were 14.1 and 14.0, respectively. Both planning regions experienced declines in reported AIDS cases from 1996 to 1997. Specifically, the numbers of AIDS cases reported from the St. Louis and the Kansas City planning regions decreased by 47.1 percent and 34.1 percent, respectively. The number of reported cases from the outstate planning regions declined by 38.4 percent from 1996 to 1997. Figure 6 shows cumulative HIV cases by county.

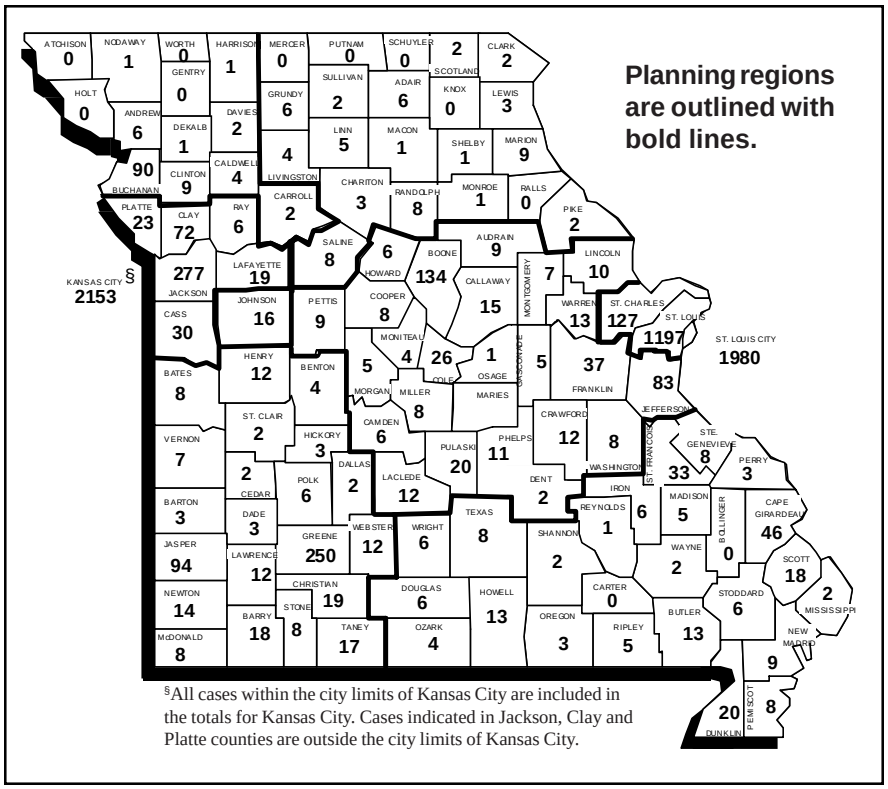


Figure 5. Reported AIDS cases not living in correctional facilities at time of diagnosis by county, Missouri, cumulative through 1997.

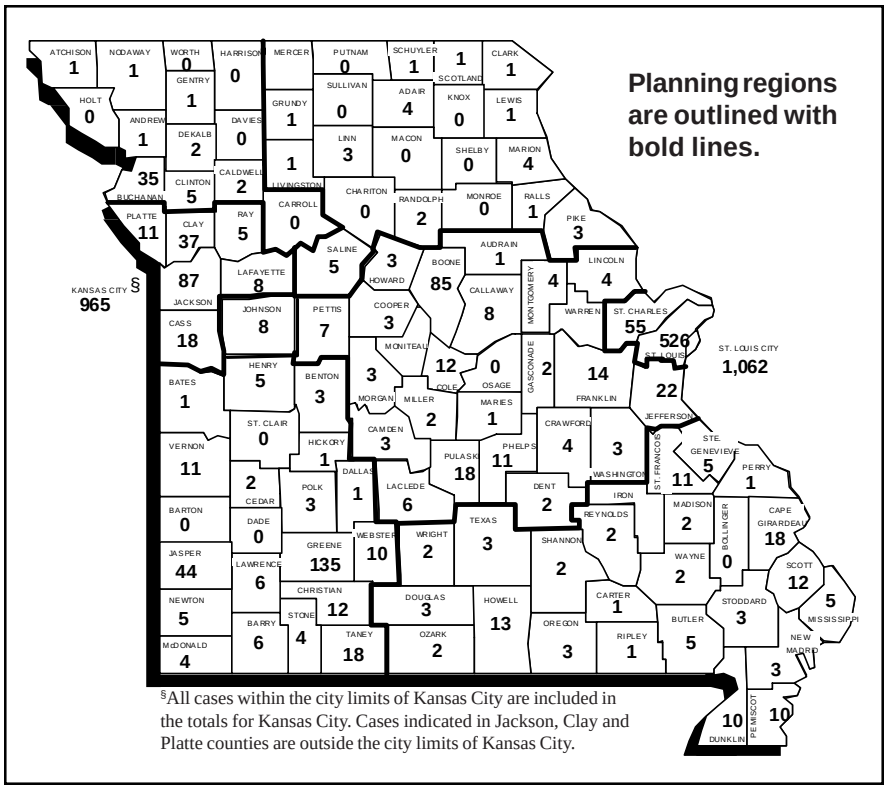
HIV Disease by Exposure Category

Men who have sex with men (MSM) continue to comprise the largest number of reported HIV disease cases. In 1997, 65.4 percent of reported cases of AIDS and 44.3 percent of reported HIV cases were in MSM. Among persons more recently infected with HIV, a smaller proportion seem to have acquired their infection through male homosexual/bisexual contact. See Table 2. Statewide, cases of AIDS among MSM declined by 40.4 percent, from 527 cases in 1996 to 314 cases in 1997. African American men have been making up a larger proportion of annually reported AIDS cases among MSM—31.0 percent of 1996 cases and 36.3 percent of 1997 cases.

Men who have sex with men and inject drugs (MSM/IDU) comprised 4.0 percent of AIDS cases and 3.0 percent of HIV cases, reported in 1997. No clear upward or downward trends in AIDS among MSM/IDU were evident in the years preceding 1997. From 1996 to 1997, the number of reported cases in MSM/IDU decreased by 72.5 percent (69 to 19 cases). The percent decreases among whites and African Americans were 63 percent and 77 percent, respectively.

Injecting drug users (IDUs) comprised 8.5 percent of AIDS cases and 10.9 percent of HIV cases reported in 1997. The annual numbers of AIDS cases among IDUs generally continued to increase until 1997. The 41 cases reported in 1997 represented a 46.1 percent decrease from the 76 cases reported in 1996. Declines were somewhat evenly distributed among whites and African Americans (41 percent and 49 percent, respectively). As a component of the High Risk Survey (HITS) II, Missouri will oversample

(continued on page 28)



§All cases within the city limits of Kansas City are included in the totals for Kansas City. Cases indicated in Jackson, Clay and Platte counties are outside the city limits of Kansas City.

Figure 6. Reported HIV cases not living in correctional facilities at time of diagnosis by county, Missouri, cumulative through 1997.

(continued from page 27)
IDUs to determine current HIV testing patterns, barriers to testing, and prevention strategies among this high risk population.

Heterosexual contacts comprised 11.7 percent of AIDS cases and 11.7 percent of HIV cases reported in 1997. The annual number of reported cases of AIDS in heterosexual contacts has, in general, increased until 1997. The 56 cases reported in 1997 reflect a 39.1 percent decrease from the 92 cases reported in 1996. Declines were seen in both whites and African Americans (58 percent and 23 percent, respectively). For the past four years, African Americans have made up a larger percentage of annually reported heterosexual AIDS cases than whites. For cases reported in 1997, 76.8% were in African Americans. African Americans also appear to be comprising a larger proportion of more recently infected persons who acquired their HIV infection through heterosexual contact.

Perinatal HIV Infection and Ryan White Care Act Requirements

Through 1997, a total of 41 perinatal (mother to infant) AIDS cases and 34 perinatal HIV cases have been reported, including two perinatal AIDS cases and two HIV cases reported in 1997. The Ryan White Care Act of 1996 requires that all states provide recommendations for HIV counseling and voluntary testing of pregnant women, determine rates of perinatal transmission, and determine factors causing transmission (e.g., inadequate prenatal care, unavailable therapy, therapy failures). The Ryan White Care Act also mandates that all states demonstrate a 50 percent reduction in the rate of new perinatal AIDS or HIV cases as compared to the 1993 rate, or demonstrate that at least 95 percent of women who have had at least two prenatal care visits prior to 34 weeks of gestation have been tested for HIV. Through implementation of the CDC Surveillance to Evaluate Prevention (STEP) Project, Missouri has been able

Table 2. Reported HIV and AIDS Cases by Exposure Category, Missouri, 1982–1997

	HIV Cases*				AIDS Cases**				HIV/AIDS Cases	
	Reported 1997		Cumulative		Reported 1997		Cumulative		Cumulative	
Exposure Category* **										
MSM	208	(44.3%)	2,165	(58.5%)	314	(65.4%)	5,358	(72.1%)	7,523	(67.6%)
MSM/IDU	14	(3.0%)	238	(6.4%)	19	(4.0%)	669	(9.0%)	907	(8.1%)
IDU	51	(10.9%)	366	(9.9%)	41	(8.5%)	509	(6.8%)	875	(7.9%)
Heterosexual Contact	55	(11.7%)	463	(12.5%)	56	(11.7%)	495	(6.7%)	958	(8.6%)
Adult Hemophiliac	1	(0.2%)	24	(0.6%)	5	(1.0%)	143	(1.9%)	167	(1.5%)
Adult Transfusion	2	(0.4%)	16	(0.4%)	2	(0.4%)	93	(1.3%)	109	(1.0%)
Other/Unknown Adult	137	(29.1%)	387	(10.5%)	41	(8.5%)	107	(1.4%)	494	(4.4%)
Perinatal Transmission	2	(0.4%)	34	(0.9%)	2	(0.4%)	41	(0.6%)	75	(0.7%)
Other/Unknown Pediatric	0	(0.0%)	7	(0.2%)	0	(0.0%)	19	(0.3%)	26	(0.2%)
Missouri Total	**470**	**(100.0%)**	**3,700**	**(100.0%)**	**480**	**(100.0%)**	**7,434**	**(100.0%)**	**11,134**	**(100.0%)**

*HIV Cases-Persons with HIV infection who have not developed one of the specific diseases or conditions which would cause them to meet the case definition for AIDS.
**AIDS Cases-Persons with HIV infection who have developed one or more of the specific diseases or conditions which cause them to meet the AIDS case definition.
***MSM=men who have sex with men; MSM/IDU=men who have sex with men and inject drugs; IDU=injecting drug users

to document significant reductions in rates of new perinatal HIV and AIDS cases. Provisional data indicate that a major contributing factor to the reduction of cases is the use of zidovudine, which has been shown to significantly reduce the risk of mother-to-infant transmission of HIV.

Basic HIV Prevention/Treatment Information

Significant progress has been made in recent years in the treatment of patients with HIV disease, and the term "highly active antiretroviral therapy" (HAART) has come into use. Treatment with combinations of antiretroviral drugs is now being used to decrease the amount of virus in the blood and slow the progression of the disease.

Early medical treatment may help an HIV-infected person live a longer, healthier life. Persons at risk for HIV infection should be tested. If infection is detected, the individual should immediately access medical care so that he or she can receive optimal benefit from increasingly effective treatment options.

It is important to remember that the currently recommended drug combinations are not easy to take because of the large numbers of pills that must be taken at multiple specified times during the day and night, and because of side effects associated with the medications. In addition, the development of resistance to the drugs continues to be a major concern. Also, while the drugs provide significant benefit for many HIV-infected persons, they are not effective in all infected individuals.

There is no cure for HIV infection. Consequently, the prevention of new HIV infections continues to be of utmost importance. Since no vaccine for HIV is available, the only way to prevent infection is to avoid behaviors that put one at risk.

Sexual Behaviors:

☛ The surest way to protect oneself against HIV infection is not to have sex at all, or to have sex with only

(continued on page 30)

Disease Reporting

During working hours:
Cases of reportable diseases and conditions should be reported promptly to your local health department, or to the Missouri Department of Health at
(800) 392-0272.

Disease Emergencies:
When the reportable disease represents an emergency requiring immediate public health action, you can reach the Department of Health duty officer after hours, weekends or holidays at
(573) 751-4674.

STD/HIV Treatment/Prevention Guidelines

CDC. 1998 Guidelines for treatment of sexually transmitted diseases. MMWR 1998;47(No. RR-1).

CDC. Report of the NIH panel to define principles of therapy of HIV infection and Guidelines for the use of antiretroviral agents in HIV-infected adults and adolescents. MMWR 1998;47(No. RR-5).

CDC. Guidelines for the use of antiretroviral agents in pediatric HIV infection. MMWR 1998;47(No. RR-4).

CDC. Public Health Service task force recommendations for the use of antiretroviral drugs in pregnant women infected with HIV-1 for maternal health and for reducing perinatal HIV-1 transmission in the United States. MMWR 1998;47(No. RR-2).

CDC. 1997 USPHS/IDSA guidelines for the prevention of opportunistic infections in persons infected with human immunodeficiency virus. MMWR 1997;46(No. RR-12).

CDC. Public Health Service guidelines for the management of health-care worker exposures to HIV and recommendations for postexposure proplylaxis. MMWR 1998;47:(No. RR-7).

All of the above can be found at:
http://www.cdc.gov/epo/mmwr/mmwr_rr.html

Missouri Department of Health Policy to Reduce the Risk of Perinatal HIV Transmission in Missouri. Missouri Epidemiologist 1996; 18(2):1-4.
(Note that the Public Health Service guidelines on the use of zidovudine to reduce perinatal HIV transmission, and on prevention of opportunistic infections, which are listed in the References section of this article, have been updated and are listed above.)
http://www.health.state.mo.us/cgi-bin/uncgi/MoEpi

CDC. U.S. Public Health Service recommendations for human immunodeficiency virus counseling and voluntary testing for pregnant women. MMWR 1995;44(No. RR-7).
http://www.cdc.gov/epo/mmwr/preview/ind95_rr.html

(continued from page 29)

one steady, uninfected partner who is not having sex with any other person. It is best to wait to have sex until both partners are committed to a relationship.

☛ If an individual is not in such a relationship, and engages in sex, he or she should use a latex condom correctly during each episode of sexual intercourse. In addition, if one does choose to have sex with more than one partner, it is strongly recommended that the total number of partners be limited to as small a number as possible.

Drug Use Behaviors:

☛ It is highly recommended that individuals not use illicit drugs. Those using such drugs should seek drug abuse treatment to help them stop.

☛ If a person cannot stop injecting drugs, he or she should never share needles and syringes with anyone or re-use equipment used by someone else. For individuals who continue to inject drugs, the once-only use of sterile needles and syringes remains the safest, most effective approach for limiting HIV transmission.

☛ If one chooses to share or re-use injection equipment, thoroughly clean and disinfect it (using full-strength liquid household bleach) between uses. However, it must be remembered that cleaning injection equipment with cleaners, such as bleach, does not guarantee that HIV is killed.

Persons whose behavior puts them at risk for HIV infection should be tested by their medical provider or at a public health clinic. Counseling before and after testing (i.e., pretest and posttest counseling) is an integral part of the testing procedure (and is required by Missouri law).

The following are specific recommendations for counseling HIV-infected patients:

- Persons who test positive for HIV antibody should be counseled appropriately about the behavioral, psychosocial and medical implications of HIV infection.
- Appropriate social support and psychological resources should be made available to assist HIV infected persons in coping with emotional distress.
- Persons who continue to be at risk for transmitting HIV should receive assistance in changing or avoiding behaviors that can transmit infection to others.

All pregnant women should routinely receive HIV education and counseling as part of their prenatal care, and each pregnant woman should be encouraged by her medical provider to undergo voluntary HIV testing. If a pregnant woman is infected with HIV, she should be offered treatment for her infection and to reduce the risk of transmission of the virus to her infant (if she is not already receiving such treatment). HIV-infected women should not breast-feed their infants.

HIV-infected persons must not donate blood, plasma, body organs, other tissue or sperm.

HIV-infected persons are required by Missouri law to inform their personal health care providers (physicians, dentists, and other health professionals) of their infection status prior to receiving any care.

HIV-infected persons are encouraged to make use of service coordination services provided by certain local public health agencies and community-based organizations. These services are available to all Missouri residents diagnosed with HIV, regardless of income or insurance coverage, and assist individuals in linking to care services, community resources, and information. For information on these services contact the Bureau of HIV/AIDS Care and Prevention Services at (800) 359-6259.

Caring for Women: Management and Prevention of Cervicitis and Pelvic Inflammatory Disease

October 7, 1998
11:30 a.m.–2:00 p.m. CDT

Mucopurulent cervicitis (MPC) is frequently encountered in diverse clinical settings and may be predictive of the presence of STD pathogens which can cause upper genital tract infections. Acute pelvic inflammatory disease (PID) occurs in about one million women annually in the United States with costs exceeding $4.2 billion. Following a single episode of PID, approximately 25% of women will develop sequelae which include ectopic pregnancy, infertility and chronic pelvic pain.

Physicians, nurse practitioners, nurse midwives, physician assistants and registered nurses who provide care for women face many challenges when managing these clinical syndromes. This program will address these issues and more.

If you are interested in downlinking this satellite program, please contact the St. Louis STD/HIV Prevention Training Center at (314) 747-0294. You may also register at a prearranged site. For a list of prearranged participating sites contact Donna at (314) 747-1522.

Bureau of Environmental Epidemiology 1997 Annual Report

Brian M . Quinn
Bureau of Environmental Epidemiology

The Bureau of Environmental Epidemiology (BEE) has been one of the Missouri Department of Health's most diverse units. From risk and health assessment to epidemiological studies, from occupational fatality investigation to childhood lead poisoning prevention, BEE has served Missourians through a wide variety of environmental health programs.

By the end of 1997, ideas for possible changes for the Bureau were being discussed for the coming year. It was becoming more evident that the Department of Health needed a comprehensive environmental public health unit that could handle a wider variety of public health problems and issues. The idea was born to combine BEE with the Bureau of Community Environmental Health (BCEH) and create one unit that would have the staff, expertise, and resources to deal with issues such as restaurant and food production sanitation, on-site sewage, commercial lodging and milk production certification (to name just a few programs from BCEH) as well as BEE's areas of risk and health assessments, lead poisoning prevention and others. By the end of 1997, the combination of the two bureaus had moved from a possibility to a probability; the merger formally began in early 1998.

The following reports reflect program and project activity under the original BEE organization. This will be the last annual report for BEE as it was in 1997. The 1998 annual report to be published in next year's May-June issue of the *Missouri Epidemiologist* will reflect the even more diverse activity of the new comprehensive environmental health unit now named the Section for Environmental Public Health.

BEE Risk Assessment Programs

BEE's two risk assessment programs are heavily involved in assessing the risks that hazardous substances in the environment pose to human health. These programs work closely with other state and federal environmental and health agencies, including the U.S. Environmental Protection Agency (EPA), the Missouri Department of Natural Resources (DNR), the federal Agency for Toxic Substances and Disease Registry (ATSDR), the Department of Defense (DOD) and the Department of Energy (DOE). These programs assess human risk through several different kinds of documents that discuss exposure levels, safe clean-up levels and various aspects related to exposure to substances found at hazardous waste sites statewide. An EPA-funded risk assessment involves a quantitative analysis or review of information about a hazardous waste site. This kind of assessment provides a mathematical "best guess" of what will happen if the site is not cleaned up or if the site is only cleaned up to a specific level of contamination, rather than a safe (walk away) level. A state-funded risk assessment provides more generic clean-up guidelines for sites, based on similar but not identical assumptions/ formulae in contrast to EPA numbers. The information given in the following two subsections reflect extensive research, cooperation, coordination, document review and interagency communication by BEE staff. For example, an expedited risk assessment may take a month to complete, while the average, less complicated risk assessment may take as long as two months to complete and submit to EPA.

Risk Assessment Program (EPA)

The following activities were completed during 1997:

- Completed eight site-specific human health risk assessments.
- Reviewed eight site-specific ecological risk assessments.
- Developed safe residual soil levels/ remediation goals for 11 sites.
- Reviewed 12 risk assessments (from other agencies).
- Reviewed nine site documents for health-related issues.
- Attended eight training courses/ conferences.
- Attended and/or gave presentations at four public meetings.
- Attended 15 technical site meetings.
- Conducted three site visits/investigations.
- Worked on seven projects with assessors from other agencies and/or responsible parties.
- Maintained effective communication and working relationships with numerous local, state and federal agencies and organizations.

For more information, contact the program at (800) 392-7245.

Risk Assessment Program (State)

The following activities were completed during 1997:

- Reassessed 53 abandoned or uncontrolled hazardous waste sites for their risk to public health.
- Analyzed 21 sites to determine if private drinking water wells were impacted by nearby contamination.
- Continued assisting DNR by reassessing the health risks at five DOD sites. One is an active Air Force base; the other sites are inactive, but are being cleaned up for future use.
- Provided health information to DNR to assist with its Voluntary Cleanup Program. Forty of these sites are already cleaned up, while 120 more properties are in the process of cleanup.
- Completed six clean-up assessments on sites other than abandoned or

(continued on page 32)

(continued from page 31)
uncontrolled hazardous waste sites.

- Assisted DNR in developing a guidance document for their Brownfield Redevelopment Program.
- Provided consultative services to DNR's Air Pollution Control Program regarding acceptable ambient air levels at 25 sites.

For more information, contact the program at (800) 392-7245.

Public Health Assessment Program (ATSDR)

The Public Health Assessment Program is part of a state cooperative agreement with ATSDR to conduct health assessments in Missouri communities near hazardous waste sites. In contrast to EPA and state risk assessments, public health assessments provide a qualitative evaluation of exposures to contaminants at a site and related adverse health effects that could have occurred in the past, are presently occurring, or could occur in the future. These health effects are evaluated by estimating exposures based on interviews with citizens, community and elected leaders, etc., or based on review of documents such as risk assessments, site histories and any other available information about a site. Findings from these assessments are reported through different types of documents including public health assessments, site reviews and updates, health consultations and site summaries. These documents are designed to address community concerns, as well as to inform and educate the communities about sites, and help them make decisions about how to protect themselves from exposure to site-related contaminants and resulting adverse health effects. These documents also are used by environmental agencies with regulatory power (e.g., EPA) to help make the most health protective decisions when planning clean-up or remediation actions at a site.

All of these program activities represent a tremendous amount of communication, coordination and cooperation with numerous local, state and federal departments and agencies required to complete the work summarized in this report. This program has also been heavily involved in numerous other sites and issues which are currently in the early stages of community and governmental activity and development**.** In 1997, the Public Health Assessment program:

- Completed 15 health consultations.
- Hosted or attended five public availability sessions.
- Visited 11 hazardous waste sites statewide.
- Coordinated or participated in two community surveys.
- Participated in five Community Assistance Group meetings.
- Participated in numerous health education group meetings.
- Provided technical assistance to other agencies.

For more information, contact the program at (800) 392-7245.

Missouri Occupational Fatality Assessment and Control Evaluation (MO FACE) Program

This program operates through a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH). It is responsible for conducting in-depth epidemiological investigations of work-related fatalities including deaths resulting from falls, electrocutions, machinery-related incidents, confined-space incidents and other causes. Occupational Fatality Reports produced from these investigations are shared with NIOSH, the employer involved, and safety groups statewide. The MO FACE program works closely with employers involved in workplace fatalities to help them take steps to prevent similar incidents from happening again. The program is also developing intervention initiatives, such as workshops and seminars, to help employers recognize workplace hazards so they can prevent fatalities before they occur. In addition to the above program activities, the MO FACE program conducted a special one year surveillance project on fire fighter and emergency responder injuries. The following is a synopsis of MO FACE program activities during 1997:

- Completed 15 occupational fatality investigations:
  - 2 machine-related incidents
  - 11 falls
  - 1 electrocution
  - 1 trench cave-in
- Reviewed notification of more than 300 possible workplace fatalities and determined 150 were traumatic work-related fatalities**.**
- Created, coordinated and conducted a fire fighter and emergency responder injury surveillance program.
- Identified 144 traumatic, lost work time injuries to fire fighters out of more than 400 incidents reported to this office. Six of these incidents were investigated by FACE Personnel.
- Maintained close working relationships with MO FACE surveillance system participants (114 county coroners, 114 sheriff's departments, 548 police departments, 804 fire departments and 221 ambulance services).
- Gave 19 presentations on both the MO FACE program and the Fire Fighters Injury Project.

For a copy of the 1997 MO FACE Annual Report, contact the program at (800) 392-7245.

Childhood Lead Poisoning Prevention Program

Childhood lead poisoning is one of the most common preventable environmental health problems in the world today. Its toxic health effects on young children's developing nervous, hematopoietic and renal systems range from acute (coma and seizures) to subtle (learning and behavioral problems or anemia). Children are at greater risk due to hand-to-mouth behaviors that allow ingestion of lead dust. Testing, treatment

and prevention of access to lead hazards are key elements to finding and, ultimately, eliminating childhood lead poisoning.

Today, the most frequent cause of lead poisoning in children is the dust and debris from deteriorating lead-based paint found primarily in older housing. While Missouri has its share of older homes containing lead-based paint, the state also features areas of contaminated soil near lead mines and smelters due to its unique role as the largest producer of lead and lead products in the United States.

During 1997, 39,402 Missouri children, less than 6 years of age, were reported as being screened for lead poisoning. The number of children found with blood lead elevations ≥10 mg/dl (the level at which a child is considered lead poisoned) decreased from 17.4 percent (7,663/43,958 screened) in 1996 to 13.7 percent (5,382/39,402 screened) in 1997.

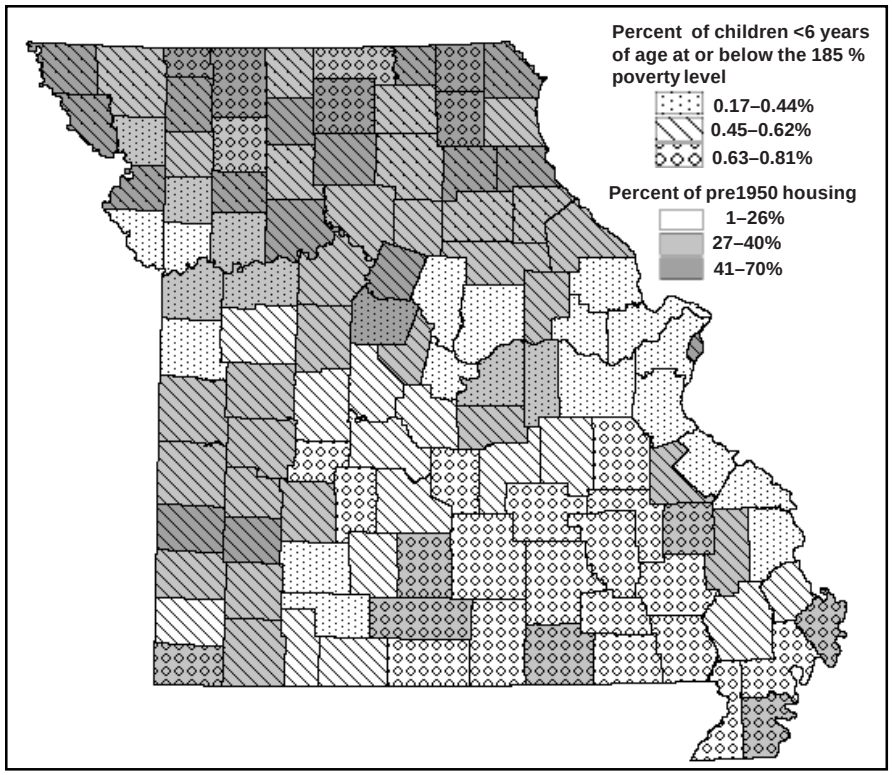


Figure 1. Percent of pre-1950 housing and percent of children <6 years of age at or below the 185 percent poverty level by county, Missouri, 1990.

In November 1997, CDC released new guidelines entitled "Screening Young Children for Lead Poisoning: Guidance for State and Local Public Heath Officials." The document proposes the development of a statewide screening plan to target childhood blood lead screening efforts, based on analysis of certain risk factors, so that it is focused to benefit children who are most in need of these services. It suggests that in developing a statewide plan, state health officials should form an advisory committee which includes child health-care providers as well as representatives from local health departments, managed-care organizations, Medicaid, private insurance organizations and the community. The Department of Health began this process in January 1998 and the Childhood Lead Screening Advisory Committee continues to meet today to develop the Missouri Statewide Screening Plan.

Pertinent risk factors to be examined in the development of the statewide screening plan include the quantity of pre-1950 housing (due to a higher concentration of lead-based paint) and current screening data. Poverty indicators may also be incorporated into the data to assist in identifying areas where children are at increased potential for inhabiting older and deteriorating housing. In Missouri, other useful factors to include are whether parents are employed at lead mines or smelters and/or other lead occupations and hobbies.

According to the 1990 U.S. Census, 28.6 percent of the housing stock in Missouri was built prior to 1950. Figure 1 shows the percentage of pre-1950 housing by county in Missouri with an overlay of the percentage of children less than 6 years of age who are at or below 185 percent of the poverty level. Smaller geographic boundaries (such as zip codes, census tracts, etc.) identify areas with higher potential risk for lead poisoning. Unfortunately, in many areas of Missouri, inadequate numbers of children are screened, preventing the comparison of risk to reality.

A major function of the Missouri Childhood Lead Poisoning Prevention Program is to increase the number of reported blood lead screenings in order to determine the extent of lead poisoning and its location. Efforts necessary to accomplish this include educating Medicaid managed care plans and physicians regarding required blood lead screening during 12- and 24-month well-child visits, encouraging private laboratory reporting, and increasing general public awareness through various media sources. Future efforts will continue to be focused on areas identified to have the greatest potential risk to children based on housing, poverty, screening numbers and lead occupations.

Another primary role of the Missouri Childhood Lead Poisoning Prevention Program is to identify the source of lead hazard in the environment for a child

(continued on page 34)

(continued from page 33)
with a confirmed elevated blood lead level, then to prevent or eliminate access to the hazard. Home environmental assessments are generally conducted by a public health nurse and sanitarian (trained in lead hazard assessment) who educate the family about specific personal hygiene, such as frequent and thorough handwashing of the child, washing toys, wet mopping to remove lead dust from floors and surfaces where small children play, and good nutrition through a diet high in iron and calcium to prevent bodily absorption of lead. During 1997, 2,552 environmental assessments were conducted to detect the source of the lead hazard for children reported with elevated blood lead levels.

Throughout the state, other lead program efforts include increasing community awareness and involvement in the efforts to eliminate and prevent childhood lead poisoning. Information concerning the level of risk for childhood lead poisoning for local needs assessments play an integral role in this process. For further information, please contact your local health department, or call the Childhood Lead Poisoning Prevention Program at (800) 575-9267.

Missouri Hazardous Substances Emergency Events Surveillance (HSEES) Program

The HSEES program is responsible for monitoring, collecting and interpreting information on emergency events involving the release of hazardous substances (spills, releases, accidents or threats of these). This information is analyzed to provide a clear picture of how such events affect the health and well-being of Missourians. The results are then used to help protect the public from injury and death caused by exposure to hazardous substance releases.

During 1997, a total of 2,272 potential environmental emergencies were reported to the HSEES program. Of these, 183 met the case definition of a hazardous substance release.

This program's complete annual report may be found on pages 14–16 of this issue. For more information, contact the program at (573) 526-4175.

Environmental and Occupational Diseases and Conditions Passive Surveillance System

The bureau maintains this passive surveillance system to document occupational diseases and health conditions which are required to be reported to the Department of Health by 19 CSR 20-20.020 and 19 CSR 20-20.080. Each year, the surveillance system receives reports on cases of environmental and occupational diseases and conditions that are entered into a database for evaluation and analysis. Cases of lead poisoning in children under 6 years of age are not included in the system because they are tracked by the state's childhood lead poisoning prevention program described earlier.

The majority of conditions reported within a given year typically are lead poisoning in adults and lead poisoning in 6 to 17-year-olds. However, final reports for lead poisoning in these two age groups were unavailable for this annual report. Also reported to the surveillance system are acute chemical poisoning (1 case in 1997) and carbon monoxide poisoning (34 cases in 1997).

For more information, contact the program at (800) 392-7245.

Radiological Health Program

BEE's Radiological Health Program is responsible for overseeing and regulating sources of ionizing radiation in non-medical settings. These sources are used in many ways, for example in nuclear pharmacies and industrial radiography. The program is also involved in emergency response and environmental radiation activities. Program staff conduct radon surveys statewide and provide radon information through seminars, displays and public awareness presentations. The Radon Hotline provides Missouri residents easy access to radon information. In 1997, the Radiological Health Program:

- Continued to register and reregister ionizing radiation sources used in non-medical settings:
  - 86 industrial radioactive material users
  - 113 x-ray users
- Performed periodic radiation safety surveys of industrial x-ray and radioactive material registrants.
- Participated in extensive training activities in preparation for emergency events at the Callaway and Cooper county nuclear plants. Training included drills, dress rehearsals and exercises. This year's Callaway exercise was federally evaluated and the bureau successfully demonstrated the capability to protect public health and safety in the event of a nuclear plant emergency event.
- Responded to four requests for assistance by scrap metal recyclers and landfill operators to locate and characterize radioactive sources.
- Participated for the eighth year in an EPA radon grant which provides funding for radon activities concentrated in counties that have a high potential for elevated radon levels. Activities included radon surveys in schools and working with county health departments to do radon testing in their counties.
- Continued to maintain and cultivate close working relationships with local, state and federal agencies and organizations including the Missouri Department of Natural Resources, Environmental Protection Agency, American Lung Association, Missouri Association of School Administrators and the Missouri Public Health Association. These relationships provided opportunities for information exchange, data gathering, coalition building, community outreach and funding.
- Presented 24 radon awareness programs at seminars, health fairs and other meetings.

- Provided radon detectors to 24 county and three city health departments for testing in their areas. These agencies distributed more than 1,200 detectors to the public.
- Received approximately 600 phone calls through the Radon Hotline.

For more information, contact the Radon Hotline at (800) 669-7236.

Special Studies

One of BEE's most important functions is to coordinate and conduct special epidemiological studies that are designed to determine whether and to what extent Missourians are exposed to hazardous substances in the environment. These studies require a tremendous amount of time, effort, coordination, planning, financial resources and personnel. A study can take up to two years or longer to complete from inception to the published final report. The following summarizes special study efforts in 1997:

The bureau continued a lead exposure study, funded by ATSDR, in children between the ages of 6 months to 6 years living in the area around the Big River Mine Tailings Site in St. Francois County. The study found that 17 percent of the participants in the study area had elevated blood lead levels, compared to three percent in the control area. Analysis of environmental samples and questionnaire data was completed in 1996. The final report was released to the public on May 27, 1997. If you have questions regarding this study or its availability, please call (800) 392-7245.

The bureau also continued a study to determine the exposure of area residents to emissions from the dioxin incinerator in Times Beach, Missouri. The first round of blood samples was collected in September 1995, before the incinerator began operation in March 1996. Blood samples were taken from 76 participants in the study area and 74 participants in a comparison area. The second sampling was performed in July 1996, approximately four months after the incinerator began operation. Second-round blood samples were taken from 75 of the original 76 participants in the study area and from 70 of the original 74 participants in the comparison area. The third and final sampling was conducted June 19–24, 1997.

Analysis of study results showed no increase in blood-dioxin levels between the first and second blood samples in the study population (persons living near the incinerator) or in the comparison population (persons living away from the incinerator). In fact, blood dioxin levels in both populations decreased between the first and second samples. The average tetrachlorodibenzo-p-dioxin (TCDD) concentration in study area participants was 1.81 parts per trillion (ppt) in the first sampling and 1.24 ppt in the second round. The average decrease for that group was .57 ppt. In comparison, the average TCDD in the participants from the comparison area for the first and second rounds were 1.43 and 1.38 ppt, respectively, an average decrease of .05 ppt.

Final results from all three sampling rounds will be summarized in a study report to be released to the public by early summer 1998.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Jan 98	Feb 98	Total YTD
Specimens Tested	8,511	7,648	16,159
Initial (percent)	75.3%	76.8%	12,277
Repeat (percent)	24.7%	23.2%	3,882
Specimens: Unsatisfactory	90	82	172
HT Borderline	827	743	1,570
HT Presumptive	20	13	33
PKU Borderline	1	0	1
PKU Presumptive Positive	1	1	2
GAL Borderline	4	1	5
GAL Presumptive Positive	1	0	1
FAS (Sickle cell trait)	92	81	173
FAC (Hb C trait)	22	27	49
FAE (Hb E trait)	1	2	3
FAX (Hb variant)	13	10	23
FS (Sickle cell disease)	5	4	9
FSC (Sickle C disease)	2	1	3
FC (Hb C disease)	0	0	0

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

Animal Rabies Surveillance - 1997

F. T. Satalowich, D.V.M., M.S.P.H.
Bureau of Veterinary Public Health

On the world scene, someone dies from rabies every ten minutes. Rabies is endemic in Missouri and activity continued at a low incidence level during 1997. This decline in rabies incidence started after the 1980 epidemic. Incidence declined through 1988 to a level of 36 cases. In 1989 the incidence rose to 62 cases. With that 72 percent increase, it was expected that the historic seven-year cycle of rabies epidemics was beginning. However, the number of cases dropped to 30 in 1990 and has averaged 30 cases a year for the past seven years. See Figure 1.

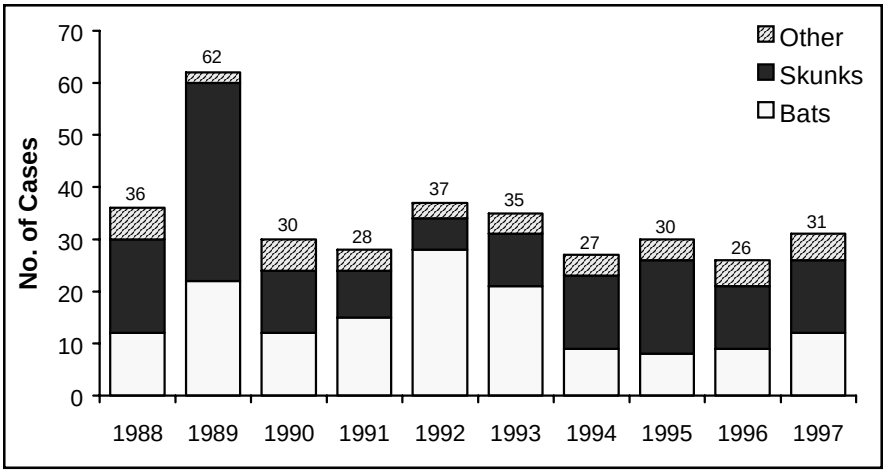


Figure 1. Confirmed animal rabies cases by year and species, Missouri, 1988–97.

The historic cycle does not appear to have continued. A number of reasons can be presented. The rabies reservoir skunk populations have been down in Illinois and Missouri. It is not known if the numbers have been significantly low enough to prevent a bite transmitted disease from reaching high levels, or if the Missouri skunks have developed some immunity to the North Central Strain of the rabies virus. It is also likely that the passive surveillance system, capturing such low numbers of cases, further influences the public's attention and interest thereby decreasing the number of animals submitted for evaluation.

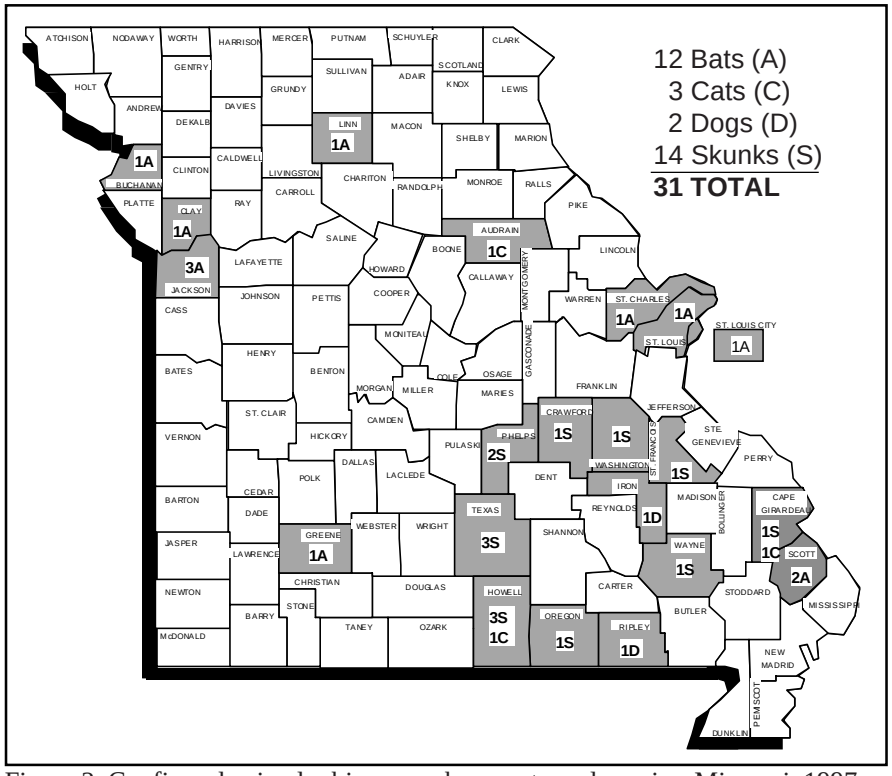


Figure 2. Confirmed animal rabies cases by county and species, Missouri, 1997.

Another positive approach to the decline in animal rabies could be the adherence to aggressive public health measures to prevent rabies. Rabies vaccines of three years duration of immunity have been in use for 15 years in domestic animals. This may have taken the stray animal population, previously vaccinated as pets, out of the equation of transmission of rabies both to wild and domestic animals. The stringent policy of euthanasia of unvaccinated dogs or cats exposed to laboratory-confirmed rabid animals may have prevented additional cases and outbreaks of rabies. Collectively, all of these factors probably contributed to the low level of rabies incidence. The test will come when the raccoon strain of rabies, now in Ohio and traveling at 30 miles per year, reaches our borders.

Missouri had 31 cases of animal rabies in 1997, including 14 skunks and 12 bats. Figure 2 shows confirmed rabies cases by county and species in 1997. Wild animal rabies spilled over into domestic animals to account for three cases of cat rabies and two cases of dog rabies.

Although monoclonal antibody strain identification was not accomplished in 1997, classification of the cases from those counties with activity in 1998, indicates that skunks in Missouri are being affected by the South Central Strain of rabies. Missouri is known to be

Cardinal Rules of Rabies Control

- All cats, dogs and ferrets should be vaccinated by a professional.
- A program of stray animal control should be instituted.
- Individuals should be instructed to stay away from wild and stray animals.
- **All** animal bites should be medically evaluated.

affected by both the North Central and South Central strains.

Historically, rabies has moved from the northeastern part of the state to the southwest in five to seven year cycles. This latest picture is different in that cases have been occurring along the Arkansas border for several years, moving northward at a slow rate. This past year showed that movement extend to Crawford, Washington and Phelps counties. All positive rabies cases being tested this year are being identified by Kansas State University. The confirmation of the movement of virus strains will be evaluated during the coming year.

Bat rabies averaged 15 cases per year for the past ten years, with only nine cases per year during the past four years. See Figure 1. In 1997, there were 273 bats tested with 12 confirmed positive, resulting in a four percent positive rate. The number and species of bats found positive in Missouri were seven Big Brown, three Red and two Hoary bats.

On the 1996 national picture (latest available data), animal rabies was down from the preceding year to a total of 7,128 cases. Wild animals accounted for 92 percent (6,550) of all rabies cases; raccoons accounted for 55 percent (3,595), skunks 25 percent (1,656), bats 11 percent (741) and foxes six percent (412). Other wild animals included: 43 ground hogs, 36 mongoose, 23 bobcats, 19 coyotes, five otters, three deer, two rabbits, two squirrels, two opossums, two fishers, two bisons, one elk, one shrew and one mink. Domestic animal rabies accounted for eight percent of the total, with cats accounting for 46 percent (266) of the cases, cattle 23 percent (131), dogs 19 percent (111) and horses eight percent (46). Other domestics included: 16 sheep/goats, three ferrets and one llama. Four human cases of rabies occurred nationwide in 1996.

Animal bites should be reported to your local health department or a medical authority, especially since Missouri is considered an endemic area. Evaluation of bites for possible post-exposure rabies treatment is a part of the four *Cardinal Rules* of rabies control. See sidebar.

While bite incidence rates are not available for Missouri, various national statistics are available and applicable to Missouri. There are 4.5 million dog bites annually in the United States. In 1996, 334,000 individuals (average age 15 years) were presented to emergency rooms (ER) because of dog bites. One percent of all ER visits are due to animal bites. The total annual cost of ER treatment of dog bites is estimated to be **$102.4 million.**

Communities are urged to enact an animal control ordinance. A model ordinance is available for your guidance from the Bureau of Veterinary Public Health at (573) 751-6136. Appropriate pet selection and responsible pet ownership are essential if animal bites are to be alleviated.

Each animal bite wound should be attended to in the following manner:

- Immediately wash wound with soap and water and/or viricidal agent.
- Irrigate the wound as necessary with buffered saline.
- Apply an antibacterial compound and provide anti-tetanus treatment, if required.
- Debride the wound as required.
- If rabies post exposure is going to be given, thoroughly infiltrate

(continued on page 38

Regimen for Rabies Post-Exposure Prophylaxis:

- Five doses of rabies vaccine administered IM in the upper deltoid in adults and/or the anterior thigh in young children or infants
- One dose administered on each of days 0, 3, 7, 14, and 28
- One time administration of HRIG

Regimen for Rabies Immune Globulin (HRIG):

- Administer on day 0, day patient presents or whenever rabies vaccine is indicated.
- Dosage: 20 IU/kg (0.133 ml/kg)
- Infiltrate as much HRIG as anatomically feasible locally into the wound(s).
- Remaining HRIG should then be administered IM in an active muscle, in the gluteal region or the anterior region of the thigh muscles

Regimen for Post-Exposure Prophylaxis in Previously Immunized Individuals

- Local wound therapy
- Two doses of rabies vaccine administered IM in deltoid region
- Administer on days 0 and 3.

(continued from page 37)

immediate area with rabies hyperimmune globulin (HRIG).
- Suturing of wound is not recommended unless unavoidable.

No therapy is effective for preventing death due to rabies infection after onset of clinical disease. Therefore, the focus of treatment must be on preventing the virus from reaching the central nervous system. Primary wound management, along with timely and proper administration of rabies immune globulin and vaccine, is essential. Each patient that is presented needs to be evaluated for possible rabies post-exposure prophylaxis (PEP). Those indications are:
- Epidemiological evidence for need of PEP
- Patient clinical picture and history
  a. bite or scratch with infectious material penetrating intact skin
  b. contact with saliva/infectious material to wound or mucous membranes
- Reservoir wild animals, including bats
  a. physically present and bite cannot be ruled out and rabies in the animal (bat) cannot be ruled out by testing.

Guidelines for alteration of the PEP regimen are as follows:
- It is never too late to initiate PEP, unless clinical signs are already present.
- If PEP vaccine schedule is interrupted,
  a. consider on a case by case basis
  b. generally the regimen is resumed
- If the delay is significant—or If patient is immunosuppressed
  a. sequential monitoring of rabies titers should be conducted
  b. possible administration of additional vaccine maybe required.
- In no situation should the entire series be re-initiated.
- Administration of additional HRIG is contraindicated.

Numerous rabies vaccines are available. See sidebar. Individuals requiring PEP or pre-exposure vaccination should contact their personal physicians for these services. The Bureau of Veterinary Public Health will continue to be available for consultation.

To assist the vaccine production companies in determining the amount of PEP that is needed in the country, the Missouri Department of Health has been asked to enumerate the number of PEP that are given in the state. We are, therefore, asking each physician and hospital that provides this treatment to complete the form on the top of page 39 until further notice. The form should be mailed to the Bureau of Veterinary Public Health, Missouri Department of Health, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6136.

Ferret News

Veterinary clinical practitioners should be aware that ferrets are now considered to be on equal status with dogs and cats, according the Rabies Compendium. This means that they should be vaccinated against rabies and if involved in a bite altercation, an observation period of ten days is recommended.

Hawaiian Travel

Veterinarians should advise individuals who are wanting to take their pets to Hawaii, that they may now do so. However, dogs and cats entering Hawaii must have the following:
- Two rabies vaccinations given at least six months apart, with the most recent vaccination given no less than three months and no more than 12 months prior to entry or re-entry into the state.

Human Rabies Vaccines Available in the United States for Post-Exposure and Pre-exposure Vaccination

Human diploid cell vaccine (HDCV) IMOVAX® Rabies

Pasteur Merieux Connaught Laboratories
Ph: (800) 822-2463

Brand:	IMOVAX -IM Human diploid cell vaccine (HDCV)
Package:	1 ml single dose vial w/disposable needle & syringe
Dose Regimen:	5 (post exposure) or 3 (pre-exposure)

Brand:	IMOVAX I.D.
Package:	0.1 ml single dose syringe
Dose Regimen:	3 (pre-exposure only)

Rhesus monkey fetal lung cell vaccine, Rabies Vaccine Adsorbed® (RVA)

SmithKline Beecham Laboratories
Phone: (800) 877-1158

Brand:	Rhesus diploid cell vaccine (rabies vaccine adsorbed)
Package:	1 ml single dose vial
Dose Regimen:	5 (post exposure) or 3 (pre-exposure)

Purified chick embryo cell vaccine (PCECV) RABAVERT® Rabies

Chiron Behring Therapeutics
Phone: (800) 244-7668

Brand:	*RabAvert*
Package:	1 ml single dose
Dose Regimen:	5 (post exposure) or 3 (pre-exposure)

REPORT FORM FOR RABIES POST-EXPOSURE PROPHYLAXIS

DATE:___/___/___ STATE:_____ COUNTY:_____

PATIENT INFORMATION:
AGE:_____ SEX:_____ WEIGHT:_____

ANIMAL:_____ CONFIRMED RABID: N_____ Y_____

TYPE OF EXPOSURE:	Y	N	
BITE	___	___	
SCRATCH	___	___	
OTHER	___	___	SPECIFY:_____

TREATMENT INFORMATION:
HRIG: N____ Y____ DOSE (ml)_____
HDCV: N____ Y____ NUMBER OF DOSES_____

TREATMENT COMPLETED: Y____ N____

IF NO, PLEASE COMMENT_____
_____
_____

Return this form to the Missouri Department of Health, Bureau of Veterinary Public Health, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6136.

- A serologic antibody test no less than three months and no more than 12 months prior to arrival in the state and a repeat test after arrival. Test results must be no less than 0.5 IU. The antibody test is known as the OIE fluorescent antibody virus neutralization (FAVN) test and is available at Kansas State University and (for military personnel only) at the Department of Defense Veterinary Laboratory at Fort Sam Houston, Texas.
- A microchip identification issued by the state. FAVN test results must be identified by this microchip number for results to be considered valid.
- A health certificate written in English.

A microchip identification and health certificate can be obtained from your local veterinarian.

1997 Communicable Disease Outbreaks

(continued from page 5)
of hepatitis A, 350 cases of culture-confirmed influenza A in a college, 15 cases of head lice (*Pediculosis capitis*) associated with a school, and 15 cases of ringworm of the scalp (tinea capitis) affecting members of a school wrestling team. Seven cases of foodborne *Staphlococus aureus* occurred among members of a bus tour group who had eaten at the same restaurant.

1997 Nosocomial Outbreaks

Hospitals, nursing homes and other health-care facilities or institutions in Missouri reported 33 health-care-associated (nosocomial) outbreaks of communicable disease during 1997. Altogether, 686 cases of illness were reported. This is a slight decrease of 2.9 percent from the 34 outbreaks (783 cases) reported in 1996.

In 30 (90.9%) of the outbreaks, transmission of disease was person-to-person. Of the three outbreaks of chickenpox (varicella), two were suspected to be airborne with person-to-person transmission a possibility in the third outbreak. Although there is evidence the index case in the latter outbreak of chickenpox exhibited shingles (herpes zoster), the possibility of airborne transmission cannot be ruled out, even though the risk of transmission in cases of shingles is usually associated with vesicular contact. Table 2 on page 5 categorizes nosocomial outbreaks for 1997 by cause and number of cases.

Missouri
EPIDEMIOLOGIST

Published by the
Missouri Department of Health
P.O. Box 570
Jefferson City, MO 65102-0570
www.health.state.mo.us

The *Missouri Epidemiologist* is a regularly scheduled bimonthly newsletter published jointly by the Office of Epidemiology, Center for Health Information Management and Epidemiology (CHIME) and the Division of Environmental Health and Communicable Disease Prevention (EHCDP). CHIME's responsibilities include managing health statistical systems, epidemiological functions and information systems of the department. EHCDP's responsibilities include the prevention and control of communicable diseases and environmentally induced illnesses, including the requisite epidemiological investigations.

The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272.

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Office of Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

LATE BREAKERS

☞ International honors were recently bestowed on the Department of Health's Missouri Health Strategic Architecture and Information Cooperative Project (MOHSAIC). The 1998 Computerworld Smithsonian Award recognized MOHSAIC for its innovative use of information technology in a way that has a profound, positive and demonstrable impact on mankind. Missouri was recognized for taking the lead in the nation in developing an integrated statewide health information system, which will dramatically improve the identification and understanding of health threats, health status and risk behaviors. Only three other states are presently working on an integrated system. A description of MOHSAIC was given in the January-February 1998 issue of the *Missouri Epidemiologist*. For more details, contact Nancy Hoffman at (573) 751-6272.

☞ Recent changes to 210.030, RSMo, Blood Tests for Pregnant Women, more clearly define the responsible parties for the administration of prophylactic treatment of babies born to Hepatitis B positive women and women whose status is unknown. It states that "the physician or person who professionally undertakes the pediatric care of a newborn shall also administer the appropriate doses of hepatitis B vaccine and gammaglobulin specific for hepatitis B, or HBIG, within twelve hours of birth to infants born to mothers who are hepatitis B positive." It also stipulates that when "the results of such test are unknown within twelve hours, the hepatitis B vaccine and gammaglobulin specific for hepatitis B, or HBIG, shall be administered as soon as possible." Questions concerning the prenatal screening law should be directed to the Bureau of Immunization at (800) 699-2313.

☞ The Centers for Disease Control and Prevention (CDC) recently published updated guidelines for management of health-care workers who have occupational exposure to human immunodeficiency virus (HIV); the guidelines also contain recommendations for HIV postexposure prophylaxis. (CDC. Public Health Service guidelines for the management of health-care worker exposures to HIV and recommendations for postexposure prophylaxis. *MMWR* 1998;47[No. RR-7]). CDC has also published guidelines which contain current recommendations for management of occupational exposures to hepatitis B and hepatitis C viruses. (CDC. Immunization of Health-Care Workers: recommendations of the Advisory Committee on Immunization Practices [ACIP] and the Hospital Infection Control Practices Advisory Committee [HICPAC]. *MMWR* 1997;46[No. RR-18]). Both sets of guidelines are available on the World Wide Web at http://www.cdc.gov/epo/mmwr/mmwr_rr.html.

Missouri EPIDEMIOLOGIST

Volume 20, Number 4 *July-August 1998*

1997–98 Influenza Summary

Mary E. Kliethermes, R.N., B.S.
Bureau of Communicable Disease Control

The 1997–98 influenza season began in mid-November. On November 18, 1997, two, symptomatic 3-year-old children were cultured for influenza by the Cape Girardeau County Public Health Center. The cultures were sent to the State Public Health Laboratory and then the influenza isolates were forwarded to the Centers for Disease Control and Prevention (CDC). The two specimens were the first Missouri laboratory-confirmed cases of influenza A/Wuhan/395/95-like (H3N2) for the 1997–98 season.

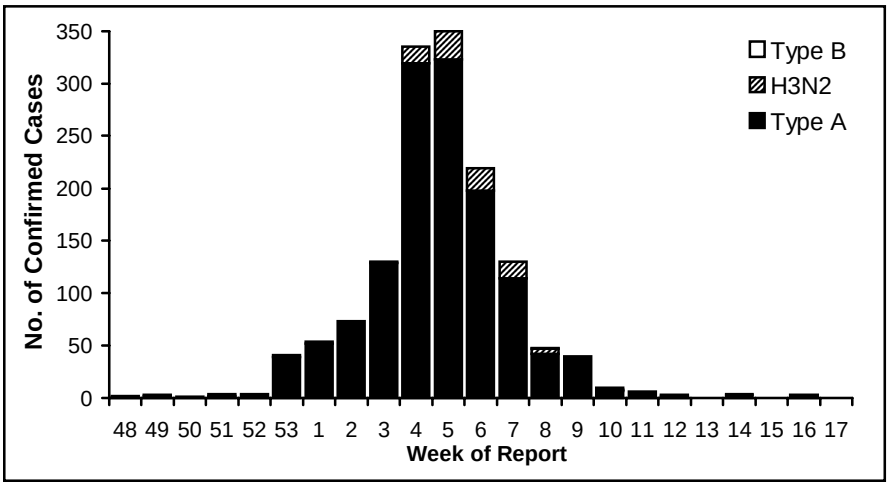


Figure 1. Laboratory-confirmed influenza cases by week of report, Missouri, 1997–98 season.

There was a total of 1,462 laboratory-confirmed cases of influenza reported in Missouri during the 1997–98 season. Of the 1,462 confirmed cases, 1,459 (99.8%) were type A, with 99 subtyped as H3N2. There were three (0.2%) confirmed cases of type B influenza reported in Missouri. Confirmed influenza type A cases peaked during week 5. See Figure 1.

During January and February, the Department of Health received ten reports of influenza-like illness outbreaks in long-term care facilities. Another influenza-like outbreak occurred in March. Four of the outbreaks were confirmed as type A, but none of the specimens were subtyped.

(continued on page 2)

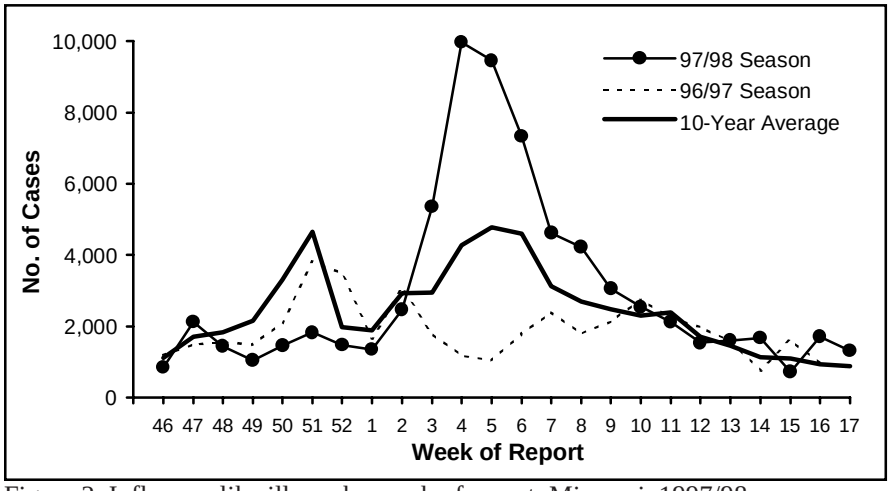


Figure 2. Influenza-like illness by week of report, Missouri, 1997/98 season, 1996/97 season and 1987–97 average.

Inside this Issue...

(continued from page 1)

Most notable during this influenza season were the large number of schools and school districts that cancelled classes from one to four days due to influenza-like illness absenteeism. From mid-January to mid-February, 29 schools reported increased student, teacher and staff absenteeism due to influenza-like illness. During the same period, three communities, three correctional facilities and one university reported influenza-like illness outbreaks. One community, two correctional facilities and the university submitted culture specimens related to the outbreaks to the State Public Health Laboratory that confirmed influenza A, subtype H3N2.

Confirmed cases of influenza type A began increasing during week 53 and peaked during week 5. The established Missouri active surveillance sites reporting to local health agencies and Missouri physicians participating in the U.S. Influenza Sentinel Physician Surveillance Network (see article on page 37) submitted data showing a rise of influenza-like illness starting in week 2 that peaked during week 4. Levels of confirmed influenza type A and reports of influenza-like illness gradually returned to baseline levels by week 10. See Figures 1 and 2.

The number of pneumonia and influenza deaths rose above the previous 10-year average during week 1 through week 13, and peaked during week 9. Additional peaks above the previous 10-year average also occurred during weeks 47, 49, 50, 51 and 16. See Figure 3.

Figure 4 shows laboratory-confirmed influenza cases by county of residence.

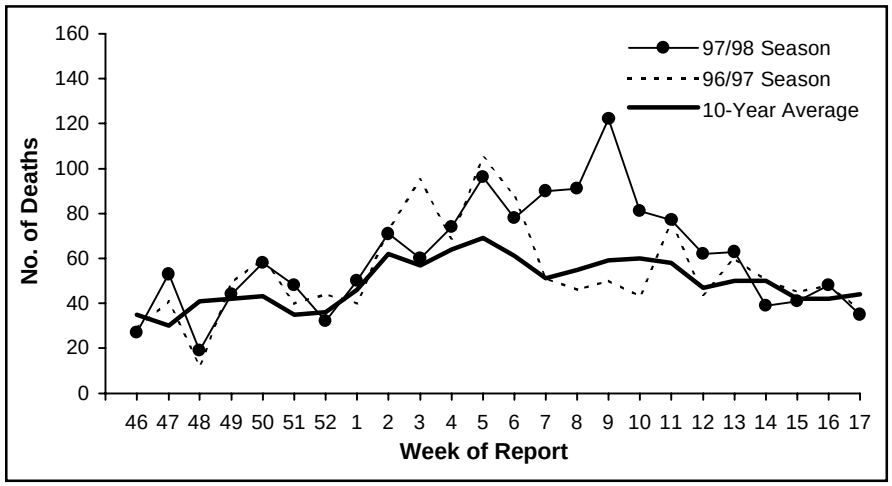


Figure 3. Pneumonia and influenza deaths by week of report, Missouri, 1997/98 season, 1996/97 season and 1987–97 average.

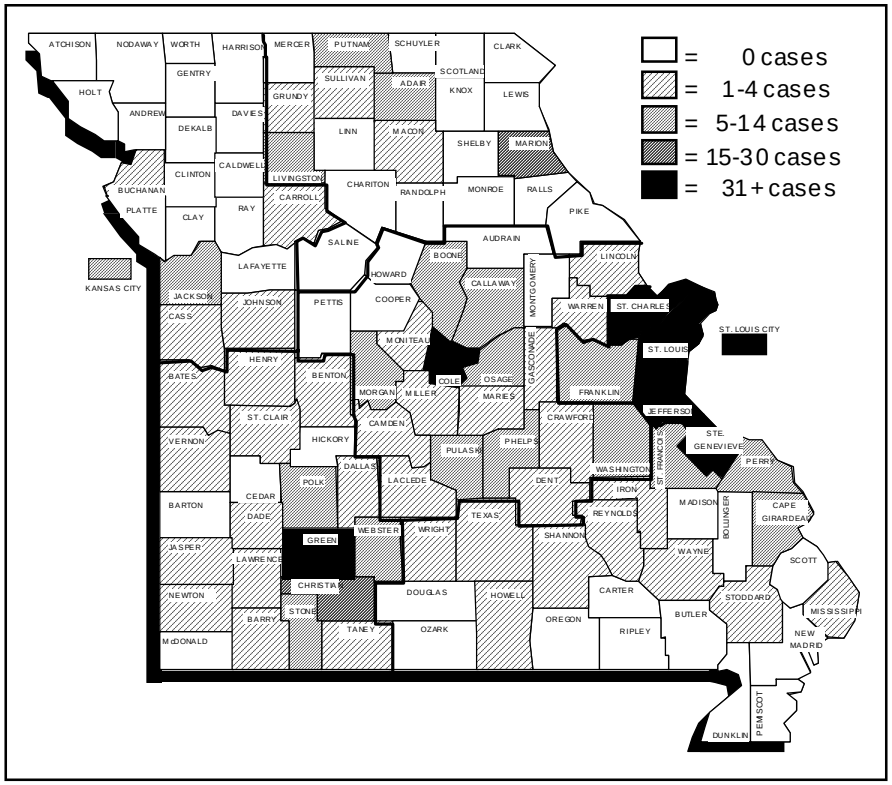


Figure 4. Laboratory-confirmed influenza cases by county of residence, Missouri, 1997–98 season.

During the 1997–98 influenza season, CDC performed antigenic characterization of influenza viruses. Of the 366 specimens submitted to their laboratory from various state health departments and antigenically characterized as influenza type A(H3N2), 16 percent were similar to A/Nanchang/933/95(H3N2), the A/Wuhan/359/95(H3N2)-like component of the 1997–98 influenza vaccine, and 84 percent were similar to A/Sydney/05/97(H3N2), a related but antigenically distinguishable variant of the A(H3N2) component of the 1997–98 influenza vaccine. CDC did confirm A/Sydney/05/97 (H3N2) virus in specimens submitted by the Missouri State Public Health Laboratory.

Influenza vaccine recommendations for 1998–99 can be found on pages 38–39 of this issue.

NOTE: Figures 2 and 3 do not include week 53 for comparison as week 53 does not occur in every influenza season. During week 53 of the 1997–98 season, 1,112 cases of influenza-like illness were reported through the active surveillance system and there were 37 pneumonia and influenza deaths.

TEAR OUT AND COPY FOR DISTRIBUTION TO PATIENTS

Vancomycin-Resistant Enterococci (VRE) Fact Sheet

What are enterococci?

Enterococci are bacteria that are normally found in the bowel and vagina of humans. When these bacteria get outside of these areas, they may cause urinary tract infections, wound infections or bloodstream infections. Enterococci are now the third most common cause of infections in hospitalized patients. These bacteria are often difficult to treat with antibiotics. However, one antibiotic that is normally effective is known as vancomycin.

How dangerous are enterococci?

They are fairly mild bacteria. Usually, they do not make healthy people sick. They can cause disease when people are very ill, like when the walls inside the bowel are damaged or when persons have devices such as catheters placed inside their bladders. Although infections with this bacteria usually clear up on their own without treatment, vancomycin-resistant enterococci cause special concern because the types of antibiotics available for treatment are limited. Many of these infections are often not treatable with the antibiotics that we have.

What are vancomycin-resistant enterococci (VRE)?

Vancomycin-resistant enterococci (VRE) are enterococci that can no longer be treated with vancomycin. This is primarily due to the high use of antibiotics. VRE now join the list of other bacteria that are difficult to treat with antibiotics.

Who gets ill with VRE?

Enterococci normally live in the bowel and genital tract. Therefore, most people have these bacteria inside of them without being ill. Those most likely to become ill with VRE are people who:

- Are older
- Have long hospital stays, especially in an intensive care unit
- Were hospitalized in the past
- Have taken antibiotics in the past
- Had prior surgery
- Have had medical devices such as urinary catheters

How is VRE passed from person to person?

These bacteria go from person to person on unwashed hands or objects. They are not carried in the air.

What can and should be done to limit the spread of VRE?

The most important control measure is good handwashing and personal cleaning habits. All care providers should routinely wash their hands before and after patient care and any time they are soiled.

Since these bacteria live in the bowel, they are found in human feces, but they may be carried in any human body fluid. Handwashing and wearing gloves should be a regular habit any time it is likely that hands will be soiled with these fluids. A gown or apron should be worn when it is likely that clothes will be soiled with another person's body fluids. Because these bacteria can be present in people without signs and symptoms of infection, it makes little sense to take "extra" precautions simply because the organism has been identified. In health care settings, the use of common sense precautions such as good handwashing and the proper use of barriers such as gloves and aprons has been found to work as well as more restrictive isolation systems.

What about cleaning and disinfection of the environment?

Since bacteria such as VRE may be passed on medical devices, methods for cleaning these devices should be in writing and should be followed. These bacteria have been found on surfaces in care areas. Although no special cleaning agents are necessary to remove them, good cleaning of surfaces in all patient care areas is important. Cleaning methods should emphasize "elbow grease".

Why do bacteria change so the antibiotics no longer work?

Some bacteria can naturally resist the effects of antibiotics. Other types of bacteria get used to living in the presence of antibiotics when antibiotics are taken often, taken when not needed or taken in the wrong doses. Later, when antibiotics are needed, the drug no longer kills these bacteria. Proper use can increase the length of time an antibiotic is useful. It is important that the public and the health care community do all they can to assure that antibiotics are ordered and used in a correct manner. Here are a few tips to increase the time that antibiotics remain effective:

- Do not pressure your doctor to prescribe antibiotics.
- Do not give your antibiotics to other people.
- Do not take antibiotics that have been sitting around the house unless prescribed by your doctor for a current illness.

Summary

1. An infection caused by bacteria that is difficult to treat with antibiotics (such as VRE) is no different than an infection caused by other bacteria, except that treatment options are limited.
2. The same infection control measures used to prevent the spread of all bacteria that can cause disease should be used to prevent the spread of bacteria like VRE.
3. The best way to prevent disease transmission is for clients and caregivers to follow good handwashing techniques and to use barriers such as gloves when soiling of the hands is likely. Other barriers such as gowns or aprons should be worn when soiling of clothing is likely.
4. Consistent and proper cleaning of surfaces like tabletops and medical devices is also important in removing these bacteria.

For more information about VRE or use of antibiotics, ask your physician or health care provider, infection control professional, pharmacist or contact:

Missouri Department of Health
Bureau of Communicable Disease Control
Ph: (573) 751-6113

Developed by Eddie Hedrick BS, MT(ASCP), CIC, Jo Micek RN, CIC and Chris Papasian PhD and approved by the Department of Health Advisory Committee on Infection Prevention and Control.

8/98

Public Health Service Guidelines for the Management of Health-Care Worker Exposures to HIV and Recommendations for Postexposure Prophylaxis

Reprinted from the Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports, Public Health Service Guidelines for the Management of Health-Care Worker Exposures to HIV and Recommendations for Postexposure Prophylaxis, May 15, 1998, Vol. 47, No. RR-7.

SUMMARY

This report updates and consolidates all previous PHS recommendations for the management of health-care workers (HCWs) who have occupational exposure to blood and other body fluids that may contain human immunodeficiency virus (HIV); it includes recommendations for HIV postexposure prophylaxis (PEP) and discusses the scientific rationale for PEP. The decision to recommend HIV postexposure prophylaxis must take into account the nature of the exposure (e.g., needlestick or potentially infectious fluid that comes in contact with a mucous membrane) and the amount of blood or body fluid involved in the exposure. Other considerations include pregnancy in the HCW and exposure to virus known or suspected to be resistant to antiretroviral drugs. Assessments of the risk for infection resulting from the exposure and of the infectivity of the exposure source are key determinants of offering PEP. Systems should be in place for the timely evaluation and management of exposed HCWs and for consultation with experts in the treatment of HIV when using PEP.

Recommendations for PEP have been modified to include a basic 4-week regimen of two drugs (zidovudine and lamivudine) for most HIV exposures and an expanded regimen that includes the addition of a protease inhibitor (indinavir or nelfinavir) for HIV exposures that pose an increased risk for transmission or where resistance to

(continued on page 6)

Occupational Exposures Also Pose Risk for Hepatitis B and Hepatitis C Infections

Health care workers (HCWs) who have an occupational exposure to a patient's blood or certain other body fluids can also be at risk for infection with other bloodborne pathogens such as hepatitis B virus (HBV) and hepatitis C virus (HCV). Recommendations for the management of HCWs who are exposed to these viruses have been published:

CDC. Immunization of health-care workers—recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC). MMWR 1997;46(no. RR-18):14-17, 22-23.
http://www.cdc.gov/epo/mmwr/preview/ind97_rr.html

CDC. Recommendations for follow-up of health-care workers after occupational exposure to hepatitis C virus. MMWR 1997;46(26):603–6.
http://www.cdc.gov/epo/mmwr/preview/index97.html

(continued from page 5)
one or more of the antiretroviral agents recommended for PEP is known or suspected. An algorithm is provided to guide clinicians and exposed health-care workers in deciding when to consider PEP.

Occupational exposures should be considered urgent medical concerns to ensure timely administration of PEP. Health-care organizations should have protocols that promote prompt reporting and facilitate access to postexposure care. Enrollment of HCWs in registries designed to assess side effects in HCWs who take PEP is encouraged.

INTRODUCTION

Although preventing blood exposures is the primary means of preventing occupationally acquired human immunodeficiency virus (HIV) infection, appropriate postexposure management is an important element of workplace safety. In January 1990, CDC issued a statement on the management of HIV exposures that included considerations for zidovudine (ZDV) use for postexposure prophylaxis (PEP) (1). At that time, data were insufficient to assess the efficacy of ZDV as a prophylactic agent in humans or the toxicity of this drug in persons not infected with HIV. Although there are still only limited data to assess safety and efficacy, additional information is now available that is relevant to this issue.

In December 1995, CDC published a brief report of a retrospective case-control study of health-care workers (HCWs) from France, the United Kingdom, and the United States exposed percutaneously to HIV; the study identified risk factors for HIV transmission and documented that the use of ZDV was associated with a decrease in the risk for HIV seroconversion (2). This information, along with data on ZDV efficacy in preventing perinatal transmission (3) and evidence that PEP prevented or ameliorated retroviral infection in some studies in animals (4), prompted a Public Health Service (PHS) interagency working group*, with expert consultation (5), in June 1996 to issue provisional recommendations for PEP for HCWs after occupational HIV exposure (6).

Since the provisional recommendations were released, several new antiretroviral drugs have been approved by the Food and Drug Administration (FDA), and more information is available about the use and safety of antiretroviral agents in exposed HCWs (7–10). In addition, questions have been raised about the use of chemoprophylaxis in situations not fully addressed in the 1996 recommendations, including when not to offer PEP, what to do when the source of exposure or the HIV status of the source person is unknown, how to approach PEP in HCWs who are or may be pregnant, and considerations for PEP regimens when the source person's virus is known or suspected to be resistant to one or more of the antiretroviral agents recommended for PEP.

In May 1997, a meeting of expert consultants, convened by CDC to consider the new information, prompted a PHS interagency working group** decision to issue updated recommendations. This document addresses the management of occupational exposure to HIV, including guidance in assessing and treating exposed HCWs, updates previous recommendations for occupational postexposure chemoprophylaxis, and updates and replaces all previous PHS guidelines and recommendations for occupational HIV exposure management for HCWs. Included in this document is an algorithm to guide decisions regarding the use of PEP for HIV exposures. The algorithm and these recommendations together address most issues that may be encountered during postexposure follow-up. As relevant information becomes available, updates of these recommendations will be published. Recommendations for non-occupational (e.g., sexual or pediatric) exposures are not addressed in these guidelines.

DEFINITIONS OF HEALTH-CARE WORKERS AND EXPOSURE

In this report, "health-care worker" (HCW) is defined as any person (e.g., an employee, student, contractor, attending clinician, public-safety worker, or volunteer) whose activities involve contact with patients or with blood or other body fluids from patients in a health-care or laboratory setting. An "exposure" that may place an HCW at risk for HIV infection and therefore requires consideration of PEP is defined as a percutaneous injury (e.g., a needlestick or cut with a sharp object), contact of mucous membrane or nonintact skin (e.g., when the exposed skin is chapped, abraded, or afflicted with dermatitis), or contact with intact skin when the duration of contact is prolonged (i.e., several minutes or more) or involves an extensive area, with blood, tissue, or other body fluids. Body fluids include a) semen, vaginal secretions, or other body fluids contaminated with visible blood that have been implicated in the transmission of HIV infection (11,12); and b) cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids, which have an undetermined risk for transmitting HIV (11). In addition, any direct contact (i.e., without barrier protection) to concentrated HIV in a research laboratory or production facility is considered an "exposure" that requires clinical evaluation and consideration of the need for PEP.

Although one non-occupational episode of HIV transmission has been attributed to contact with blood-contaminated saliva (13), this incident involved intimate kissing between sexual partners

* This interagency working group comprised representatives of CDC, the Food and Drug Administration, the Health Resources and Services Administration, and the National Institutes of Health.

** This interagency working group comprised representatives of CDC, FDA, and the National Institutes of Health. Information included in these recommendations may not represent FDA approval or approved labeling for the particular product or indications in question. Specifically the terms "safe" and "effective" may not be synonymous with the FDA-defined legal standards for product approval.

and is not similar to contact with saliva that may occur during the provision of health-care services. Therefore, in the absence of visible blood in the saliva, exposure to saliva from a person infected with HIV is not considered a risk for HIV transmission; also, exposure to tears, sweat, or non-bloody urine or feces does not require postexposure follow-up. [†]

Human breast milk has been implicated in perinatal transmission of HIV. However, occupational exposure to human breast milk has not been implicated in HIV transmission to HCWs. Moreover, the contact HCWs may have with human breast milk is quite different from perinatal exposure and does not require postexposure follow-up.

BACKGROUND

The rationale is provided here for the postexposure management and prophylaxis recommendations given at the end of the document. Additional details concerning the risk for occupational HIV transmission to HCWs and management of occupational HIV exposures are available elsewhere (16–18).

Risk for Occupational Transmission of HIV to HCWs

Prospective studies of HCWs have estimated that the average risk for HIV transmission after a percutaneous exposure to HIV-infected blood is approximately 0.3% (95% confidence interval [CI]=0.2%–0.5%) (16) and after a mucous membrane exposure is 0.09% (95% CI=0.006%–0.5%) (19). Although episodes of HIV transmission after skin exposure have been documented (20), the average risk for transmission by this route has not been precisely quantified because no HCWs enrolled in prospective studies have seroconverted after an isolated skin exposure. The risk for transmission is estimated to be less than the risk for mucous membrane exposures (21). The risk for transmission after exposure to fluids or tissues other than HIV-infected blood also has not been quantified.

As of June 1997, CDC has received reports of 52 U.S. HCWs with documented HIV seroconversion temporally associated with an occupational HIV exposure. An additional 114 episodes in HCWs are considered possible occupational HIV transmissions; these workers reported that their infection was occupationally acquired and no other risk for HIV infection was identified, but transmission of infection after a specific exposure was not documented (22). Of the 52 documented episodes, 47 HCWs were exposed to HIV-infected blood, one to a visibly bloody body fluid, one to an unspecified fluid, and three to concentrated virus in a laboratory. Forty-five exposures were percutaneous, and five were mucocutaneous; one HCW had both a percutaneous and a mucocutaneous exposure. The route of exposure for one person exposed to concentrated virus is uncertain. Of the percutaneous exposures, the objects involved included a hollow-bore needle (41), a broken glass vial (two), a scalpel (one), and an unknown sharp object (one) (CDC, unpublished data, 1998).

Epidemiologic and laboratory studies suggest that several factors may affect the risk for HIV transmission after an occupational exposure. The one retrospective case-control study of HCWs who had percutaneous exposure to HIV found that the risk for HIV transmission was increased with exposure to a larger quantity of blood from the source patient as indicated by a) a device visibly contaminated with the patient's blood, b) a procedure that involved a needle placed directly in a vein or artery, or c) a deep injury (23). (A laboratory study that demonstrated that more blood is transferred by deeper injuries and hollow-bore needles lends further support for the observed variation in risk related to blood quantity [24]). The risk also was increased for exposure to blood from source patients with terminal illness, possibly reflecting either the higher titer of HIV in blood late in the course of AIDS or other factors (e.g., the presence of syncytia-inducing strains of HIV). It was estimated that the risk for HIV transmission from exposures that involve a larger volume of blood, particularly when the source patient's viral load is probably high, exceeds the average risk of 0.3% (23).

The utility of viral load measurements from a source patient as a surrogate for estimating the viral titer for assessing transmission risk is not known. Plasma viral load measurement (e.g., HIV RNA) reflects only the level of cell-free virus in the peripheral blood. This measurement does not reflect the level of cell-associated virus in the peripheral blood or the level of virus in other body compartments (e.g., lymphatic tissue). Although a lower viral load, or results that are below the limits of viral quantification, in the peripheral blood probably indicates a lower titer exposure, it does not rule out the possibility of transmission; HIV transmission from persons with a plasma viral load below the limits of viral quantification (based on the assay used at the time) has been reported in instances of mother-to-infant transmission (25, 26) and in one HCW seroconversion (J.L. Gerberding, San Francisco General Hospital, unpublished data, May 1997).

There is some evidence that host defenses also may influence the risk for HIV infection. In one small study, HIV-exposed but uninfected HCWs demonstrated an HIV-specific cytotoxic T-lymphocyte (CTL) response when

(continued on page 8)

[†] Although exposure to these body substances generally is not considered a risk for occupational HIV transmission, this does not negate the importance of handwashing and appropriate glove use when contacting these body substances. Handwashing and appropriate glove use are part of standard precautions for infection control to prevent transmission of nosocomial and community-acquired pathogens and are required for compliance with the Occupational Safety and Health Administration bloodborne pathogen standard (14,15). In addition, postexposure evaluation for hepatitis B (and possibly hepatitis C) should be provided if contact with saliva includes a possible portal of entry (i.e., nonintact skin, mucous membrane, or percutaneous injury).

(continued from page 7)
peripheral blood mononuclear cells were stimulated in vitro with HIV mitogens (27). Similar CTL responses have been observed in other populations with repeated HIV exposure without resulting infection (28–33). Among several possible explanations for this observation, one is that the host immune response sometimes may be able to prevent establishment of HIV infection after a percutaneous exposure; another is that the CTL response simply may be a marker for exposure.

HIV Seroconversion in HCWs

Data on the timing and clinical characteristics of seroconversion in HIV-exposed HCWs are limited by the infrequency of infection following occupational exposure, variations in postexposure testing intervals, and differences over time in the sensitivity of HIV-antibody testing methods. Among the HCWs with documented seroconversions reported to CDC for whom data are available, 81% experienced a syndrome compatible with primary HIV infection a median of 25 days after exposure (CDC, unpublished data, 1998). In a recent analysis of 51 seroconversions in HCWs, the estimated median interval from exposure to seroconversion was 46 days (mean: 65 days); an estimated 95% seroconverted within 6 months after the exposure (34). These data suggest that the time course of HIV seroconversion in HCWs is similar to that in other persons who have acquired HIV through non-occupational modes of transmission (35).

Three instances of delayed HIV seroconversion occurring in HCWs have been reported; in these instances, the HCWs tested negative for HIV antibodies >6 months postexposure but were seropositive within 12 months after the exposure (36,37; J.L. Gerberding, San Francisco General Hospital, unpublished data, May 1997). DNA sequencing confirmed the source of infection in one instance. Two of the delayed seroconversions were associated with simultaneous exposure to hepatitis C virus (HCV) (37; J.L. Gerberding, San Francisco General Hospital, unpublished data, May 1997). In one case, coinfection was associated with a rapidly fatal HCV disease course (37); however, it is not known whether HCV directly influences the risk for or course of HIV infection or is a marker for other exposure-related factors.

Rationale for PEP

Considerations that influence the rationale and recommendations for PEP include the pathogenesis of HIV infection, particularly the time course of early infection; the biologic plausibility that infection can be prevented or ameliorated by using antiretroviral drugs and direct or indirect evidence of the efficacy of specific agents used for prophylaxis; and the risk/benefit of PEP to exposed HCWs. The following discussion considers each of these issues.

Role of Pathogenesis in Considering Antiretroviral Prophylaxis

Information about primary HIV infection indicates that systemic infection does not occur immediately, leaving a brief "window of opportunity" during which postexposure antiretroviral intervention may modify viral replication. Data from studies in animal models and in vitro tissue studies suggest that dendritic cells in the mucosa and skin are the initial targets of HIV infection or capture and have an important role in initiating HIV infection of CD4+ T-cells in regional lymph nodes (38). In a primate model of simian immunodeficiency virus (SIV) infection, infection of dendritic-like cells occurred at the site of inoculation during the first 24 hours following mucosal exposure to cell-free virus. During the subsequent 24–48 hours, migration of these cells to regional lymph nodes occurred, and virus was detectable in the peripheral blood within 5 days (39). HIV replication is rapid (generation time: 2.5 days) and results in bursts of up to 5,000 viral particles from each replicating cell (40; M.S. Saag, University of Alabama, personal communication, September 1997). The exponential increase in viral burden continues unless controlled by the immune system or other mechanisms (e.g., exhaustion of available target CD4+ T-cells). Theoretically, initiation of antiretroviral PEP soon after exposure may prevent or inhibit systemic infection by limiting the proliferation of virus in the initial target cells or lymph nodes.

Efficacy of Antiretrovirals for PEP

Studies in animals and humans provide direct and indirect evidence of the efficacy of antiretroviral drugs as agents for postexposure prophylaxis. In human studies and in most animal studies, ZDV was the antiretroviral agent used for prophylaxis (26,41–54). However, in more recent animal studies, newer agents also have been reported to be effective (55,56).

Data from animal studies have been difficult to interpret, in part because of problems identifying a comparable animal model for humans. Most studies use a higher inoculum for exposure than would be expected in needlestick injuries. Among the animal studies, differences in controlled variables (e.g., choice of viral strain [based on the animal model used], inoculum size, route of inoculation, time of prophylaxis initiation, and drug regimen) make attempts to apply these results to humans difficult. In the animal studies that showed efficacy of pre-exposure and/or postexposure prophylaxis, reported outcomes (4,57) have included a) suppression of viremia or delayed antigenemia (41–47); b) drug-facilitated vaccine-type response (i.e., chemoprophylaxis sufficiently inhibited viral replication to permit formation of a long-lasting, protective cellular immune response) (48–56); and c) definitive prevention of infection (i.e., chemoprophylactic efficacy) (41,52–54). More recent refinements in methodology have enabled studies more relevant to humans; in particular, the viral inocula used in animal studies have been reduced

to levels more analogous to human exposures (54,56). The results of these studies provide additional evidence of postexposure chemoprophylactic efficacy.

In studies of HIV-2 or SIV in nonhuman primates in which ZDV or 3'-fluorothymidine was used, suppression or delay of antigenemia was the most common outcome; prevention of infection was infrequent (43,52,58–60). However, two other antiretroviral agents, 2',3'-dideoxy-3'-hydroxymethyl cytidine (BEA-005) and (R)-9-(2-phosphonylmethoxypropyl) adenine (PMPA), used to study PEP in primates have been more effective in preventing infection. When PMPA was administered 48 hours before, 4 hours after, or 24 hours after intravenous SIV inoculation to long-tailed macaques, a 4-week regimen prevented infection in all treated animals (55). A 3-day regimen of BEA-005 prevented SIV infection in 12 of 12 pigtailed macaques when administered 1–8 hours after intravenous inoculation; infection also was prevented in four of four animals that received 3 days of BEA-005 within 10 minutes after HIV-2 inoculation (56).

Animal studies have demonstrated that early initiation of PEP and small inoculum size are correlates of successful PEP. ZDV initiated 1 hour or 24 hours after intravenous exposure to a rapidly lethal variant of SIV in pigtailed macaques prevented infection in one of three animals and modified SIV disease in three of six animals, respectively; PEP initiated at 72 hours had no effect (54). In macaques administered ZDV or BEA-005 1 to 72 hours after SIV intravenous challenge, earlier initiation of PEP was correlated with delayed onset and peak of antigenemia, decreased duration of antigenemia, and reduction in SIV serum titer; the most potent effect was evident when PEP was initiated within 8 hours of exposure (43,56). Studies in primates and murine and feline animal models have demonstrated that larger inocula decrease prophylactic efficacy (47,48,53,60). In addition, delaying initiation, shortening the duration, or decreasing the antiretroviral dose of PEP, individually or in combination, decreased prophylactic efficacy (42,43,45,47,50,55).

There is little information with which to assess the efficacy of PEP in humans. Seroconversion is infrequent after an occupational exposure to HIV-infected blood; therefore a prospective trial would need to enroll many thousands of exposed HCWs to achieve the statistical power necessary to directly demonstrate PEP efficacy. During 1987–1989, the Burroughs-Wellcome Company sponsored a prospective placebo-controlled clinical trial among HCWs to evaluate 6 weeks of ZDV prophylaxis; however, this trial was terminated prematurely because of low enrollment (61). Because of current indirect evidence of PEP efficacy, it is unlikely that a placebo-controlled trial in HCWs would ever be feasible.

In the retrospective case-control study of HCWs, after controlling for other risk factors for HIV transmission, the risk for HIV infection among HCWs who used ZDV as PEP was reduced by approximately 81% (95% CI=43%–94%) (23). In addition, in a randomized, controlled, prospective trial (AIDS Clinical Trial Group [ACTG] protocol 076) in which ZDV was administered to HIV-infected pregnant women and their infants, the administration of ZDV during pregnancy, labor, and delivery and to the infant reduced transmission by 67% (3). Only 9%–17% (depending on the assay used) of the protective effect of ZDV was explained by reduction of the HIV titer in the maternal blood, suggesting that ZDV prophylaxis in part involves a mechanism other than the reduction of maternal viral burden (26).

The limitations of all of these studies must be considered when reviewing evidence of PEP efficacy. The extent to which data from animal studies can be extrapolated to humans is largely unknown, and the exposure route for mother-to-infant HIV transmission is not similar to occupational exposures; therefore these findings may not reflect a similar mechanism of ZDV prophylaxis in HCWs. Although the results of the retrospective case-control study of HCWs suggest PEP efficacy, the limitations of that study include the small number of cases studied and the use of cases and controls from different cohorts.

Failure of ZDV PEP to prevent HIV infection in HCWs has been reported in at least 14 instances (62–64; G. Ippolito, AIDS Reference Center, Rome, Italy, and J. Heptonstall, Communicable Disease Surveillance Center, London, United Kingdom, personal communication, 1997). Although eight of the 13 source patients had taken ZDV, laboratory assessment for ZDV resistance of the virus from the source patient was performed in only three instances, two of which demonstrated reduced susceptibility to ZDV. In addition to possible exposure to a ZDV-resistant strain of HIV, other factors that may have contributed to the apparent failures in these instances may include a high titer and/or large inoculum exposure, delayed initiation and/or short duration of PEP, and possible factors related to the host (e.g., cellular immune system responsiveness) and/or to the source patient's virus (e.g., presence of syncytia-forming strains) (62).

Antiretroviral Agents for PEP

Several antiretroviral agents from at least three classes of drugs are available for the treatment of HIV disease. These include the nucleoside analogue reverse transcriptase inhibitors (NRTIs), nonnuceloside reverse transcriptase inhibitors (NNRTIs), and protease inhibitors (PIs) (See Appendix). Among these drugs, ZDV (an NRTI) is the only agent shown to prevent HIV transmission in humans (2,3). Although there are theoretical concerns that the increased prevalence of resistance to ZDV may diminish its utility for PEP (65), no data are available to assess whether this is a factor for consideration. Clinical data from the ACTG protocol

(continued on page 10)

(continued from page 9)
076 study documented that despite genotypic evidence of maternal ZDV resistance, ZDV prevented perinatal transmission (66). Thus, based on the available information, it is still reasonable that ZDV should continue to be the first drug of choice for PEP regimens.

There are no data to directly support the addition of other antiretroviral drugs to ZDV to enhance the effectiveness of the PEP regimen. However, in HIV-infected patients, combination regimens have proved superior to monotherapy regimens in reducing HIV viral load (67, 68). Thus, theoretically a combination of drugs with activity at different stages in the viral replication cycle (e.g., NRTIs with a PI) could offer an additive preventive effect in PEP, particularly for occupational exposures that pose an increased risk for transmission.

Determining which agents and how many agents to use or when to alter a PEP regimen is largely empiric. Guidelines for the treatment of early HIV infection recommend the use of three drugs (two NRTIs and a PI) (69); however, the applicability of these recommendations to PEP remains unknown. In addition, the routine use of three drugs for all occupational HIV exposures may not be needed. Although the use of a highly potent regimen can be justified for exposures that pose an increased risk for transmission, it is uncertain whether the potential additional toxicity of a third drug is justified for lower-risk exposures. For this reason, the recommendations at the end of this report provide guidance for two- and three-drug PEP regimens that are based on the level of risk for HIV transmission represented by the exposure.

NRTIs that can be considered for use with ZDV for PEP are lamivudine (3TC), didanosine (ddI), and zalcitabine, each of which has been included in recommended regimens that include ZDV (69). In previous CDC recommendations, 3TC was recommended as a second agent for PEP based on greater antiretroviral activity of the ZDV/3TC combination and its activity against many ZDV-resistant HIV strains without substantially increased toxicity (6). Also, data suggest that ZDV-resistant mutations develop more slowly in patients receiving the ZDV/3TC combination than those receiving ZDV alone (70), and in vitro studies indicate that the mutation associated with 3TC resistance may be associated with reversal of ZDV phenotypic resistance (71). No additional information has emerged to warrant altering the original recommendation of 3TC as the second agent for PEP. In addition, because ZDV and 3TC are available in a combination formulation (Combivir™, manufactured by Glaxo Wellcome, Inc., Research Triangle Park, NC), the use of 3TC may be more convenient for HCWs. However, individual clinicians may prefer other NRTIs or combinations of other antiretroviral agents based on local knowledge and experience in treating HIV infection and disease.

The addition of a PI as a third drug for PEP following high-risk exposures is based on the site of activity in the replication cycle (i.e., after viral integration has occurred) and demonstrated effectiveness in reducing viral burden. Previously, indinavir (IDV) was recommended as the PI for PEP because of its increased bioavailability when compared with saquinavir and its more favorable immediate toxicity profile compared with ritonavir (72). In addition, requirements for dose escalation when initiating ritonavir make it less practical for use in PEP. Since the 1996 PEP recommendations were published, nelfinavir (NEL) was approved for use by FDA and is now included in regimens recommended for the treatment of primary HIV infection (69). Also, FDA recently approved a soft-gel formulation of saquinavir (Fortovase™, manufactured by Hoffmann-LaRoche, Inc., Nutley, New Jersey) that has improved bioavailability relative to its hard-gel formulation (Invirase™, manufactured by Hoffmann-LaRoche, Inc.). However, the recommended dose of soft-gel saquinavir (1200 mg three times a day) is twice that of the hard-gel formulation (600 mg three times a day) and necessitates taking 18 pills a day, a factor that may influence HCW compliance if used for PEP. Based on these considerations, either IDV or NEL is recommended as first choice for inclusion in an expanded PEP regimen. If saquinavir is preferred by the prescribing physician, the soft-gel formulation (Fortovase™) should be used. Also, differences in the side effects associated with IDV and NEL, discussed below, may influence which of these agents is selected in a specific situation.

The NNRTIs (i.e., nevirapine and delavirdine) have not been included in these recommended regimens for PEP. As a class of antiretroviral agents, the NNRTIs are fast-acting and very potent, making them appealing in concept for PEP. In addition, there is some evidence of prophylactic efficacy (73). However, concerns about side effects and the availability of alternative agents argue against routinely using this class of drugs for initial PEP, although with expert consultation, an NNRTI might be considered.

Side Effects and Toxicity of Antiretroviral Agents

An important goal of PEP is to encourage and facilitate compliance with a 4-week PEP regimen. Therefore, the toxicity profile of antiretroviral agents, including the frequency, severity, duration, and reversibility of side effects, is a relevant consideration. All of the antiretroviral agents have been associated with side effects (See Appendix). However, studies of adverse events have been reported primarily for persons with advanced disease (and longer treatment courses) and therefore may not reflect the experience of persons with less advanced disease or those who are uninfected (74). Side effects associated with many of the NRTIs (e.g., ZDV or ddI) are chiefly gastrointestinal (e.g., nausea or diarrhea), and in general the incidence of adverse effects has not been greater when these agents are used in combination (72).

All of the approved PIs may have potentially serious drug interactions when used with certain other drugs, requiring careful evaluation of concomitant medications being used by a HCW before prescribing a PI and close monitoring for toxicity when a HCW is receiving one of these drugs (See Appendix). PIs may inhibit the metabolism of nonsedating antihistamines and other hepatically metabolized drugs; NEL and ritonavir may accelerate the clearance of certain drugs, including oral contraceptives (requiring alternative or additional contraceptive measures for women taking these drugs). The use of PIs also has been associated with new onset of diabetes mellitus, hyperglycemia, diabetic ketoacidosis, and exacerbation of preexisting diabetes mellitus (75–77). Nephrolithiasis has been associated with IDV use (including in HCWs using the drug for PEP) (8); however, the incidence of this potential complication may be limited by drinking at least 48 oz (1.5 L) of fluid per 24-hour period (e.g., six 8 oz glasses of water throughout the day) (72). Rare cases of hemolytic anemia also have been associated with the use of IDV. NEL, saquinavir, and ritonavir have been associated with the development of diarrhea; however, this side effect usually responds to treatment with antimotility agents that can be prescribed for use, if necessary, at the time any one of these drugs is prescribed for PEP. The manufacturer's package insert should always be consulted for questions about potential drug interactions.

Among HCWs receiving ZDV PEP, usually at doses of 1,000–1,200 mg per day (i.e., higher than the currently recommended dose), 50%–75% reported one or more subjective complaints and approximately 30% discontinued the drug because of symptoms (7,78,79). Common symptoms included nausea, vomiting, malaise or fatigue, headache, or insomnia. Mild decreases in hemoglobin and absolute neutrophil count also were observed. All side effects were reversed when PEP was discontinued.

Preliminary information about HCWs receiving combination drugs for PEP (usually ZDV plus 3TC with or without a PI) suggests that approximately 50%–90% of HCWs report subjective side effects that caused 24%–36% to discontinue PEP (8–10). One study documented that combination regimens that included ZDV at a lower dose (600 mg per day) were better tolerated than high-dose ZDV used alone (1,000–1,200 mg per day) (10). However, serious side effects, including nephrolithiasis, hepatitis, and pancytopenia, have been reported with the use of combination drugs for PEP (9,80; J.L. Gerberding, San Francisco General Hospital, personal communication, May 1997).

Resistance to Antiretroviral Agents

Known or suspected resistance of the source virus to antiretroviral agents, particularly to one or more agents that might be included in a PEP regimen, is a concern for those making decisions about PEP. Resistance of HIV has been reported with all available antiretroviral agents (65). However, the relevance of exposure to a resistant virus is not understood. Although transmission of resistant strains has been reported (81–85), in the perinatal clinical trial that studied vertical HIV transmission (ACTG protocol 076), ZDV prevented perinatal transmission despite genotypic resistance of HIV to ZDV in the mother (66). In addition, patients generally take more than one antiretroviral drug and, unless testing is performed, often it is difficult to know to which drug(s) resistance exists. The complexity of this issue is further compounded by the frequency of cross-resistance within drug classes.

Resistance should be suspected in source patients when there is clinical progression of disease or a persistently increasing viral load and/or a decline in CD4 T-cell count despite therapy, or a lack of virologic response to a change in therapy. Nevertheless, in this situation it is unknown whether a modification in the PEP regimen is necessary or will influence the outcome of an occupational exposure.

Antiretroviral Drugs in Pregnancy

Considerations for the use of antiretroviral drugs in pregnancy include their potential effect on the pregnant woman and on her fetus or neonate. The pharmacokinetics of antiretroviral drugs has not been completely studied in pregnant women. Some of the antiretroviral drugs are known to cross the placenta, but data for humans are not yet available for others (particularly the PIs). In addition, data are limited on the potential effects of antiretroviral drugs on the developing fetus or neonate (86). Decisions on the use of specific drugs in pregnancy also are influenced by whether a drug has specific adverse effects or might further exacerbate conditions associated with pregnancy, (e.g., drugs that cause nausea may be less tolerated when superimposed on the nausea normally associated with pregnancy).

There are data on both ZDV and 3TC from clinical trials in HIV-infected pregnant women. The most extensive experience has been with the use of ZDV after 14 weeks of gestation in pregnant HIV-infected women in phase I studies and the perinatal ACTG protocol 076 (4,87). The dose of ZDV for pregnant women is the same as that in nonpregnant persons, and ZDV appears safe and well tolerated in both women and their infants who have had a follow-up period of several years (88–90). Data from the Antiretroviral Pregnancy Registry have not documented an increased risk for birth defects in infants with in utero exposure to ZDV (91). There are limited data on use of 3TC alone or in combination with ZDV in late gestation in pregnant HIV-infected women. As with ZDV, the pharmacokinetics and dose of 3TC appear to be similar to those for nonpregnant persons. The drug appears safe during pregnancy for women and infants, although long-term safety is not known (92,93).

(continued on page 12)

(continued from page 11)

Carcinogenicity and/or mutagenicity is evident in several in vitro screening tests for ZDV and all other FDA-licensed nucleoside antiretroviral drugs. In some in vivo rodent studies, high-dose lifetime continuous ZDV exposure (94) or very high dose in utero ZDV exposure has been associated with the development of tumors in adult females or their offspring (95,96). The relevance of these animal data to humans is unknown. However, in 1997 an independent panel reviewed these data and concluded that the known benefits of ZDV in preventing perinatal transmission, where the risk for transmission without ZDV is 25%–30%, outweigh the hypothetical concerns about transplacental carcinogenesis (97).

No data are available regarding pharmacokinetics, safety, or tolerability of any of the PIs in pregnant women. The use of PIs in HIV-infected persons has been associated with hyperglycemia; it is unknown whether the use of these agents during pregnancy will exacerbate the risk for pregnancy-associated hyperglycemia. Therefore, close monitoring of glucose levels and careful instruction regarding symptoms related to hyperglycemia are recommended for pregnant HCWs receiving a PI for PEP. IDV is associated with infrequent side effects in adults (i.e., hyperbilirubinemia and renal stones) that could be problematic for the newborn. As the half-life of IDV in adults is short, these concerns may be relevant only if the drug is administered shortly before delivery.

RECOMMENDATIONS FOR THE MANAGEMENT OF POTENTIALLY EXPOSED HCWs

Health-care organizations should make available to their workers a system that includes written protocols for prompt reporting, evaluation, counseling, treatment, and follow-up of occupational exposures that may place HCWs at risk for acquiring any bloodborne infection, including HIV. Employers also are required to establish exposure-control plans, including postexposure follow-up for their employees, and to comply with incident reporting requirements mandated by the Occupational Safety and Health Administration (15). Access to clinicians who can provide postexposure care should be available during all working hours, including nights and weekends. Antiretroviral agents for PEP should be available for timely administration (i.e., either by providing access to PEP drugs on site or creating links with other facilities or providers to make them available offsite). Persons responsible for providing postexposure counseling should be familiar with evaluation and treatment protocols and the facility's procedures for obtaining drugs for PEP.

HCWs should be educated to report occupational exposures immediately after they occur, particularly because PEP is most likely to be effective if implemented as soon after the exposure as possible (41,55,56). HCWs who are at risk for occupational exposure to HIV should be taught the principles of postexposure management, including options for PEP, as part of job orientation and ongoing job training.

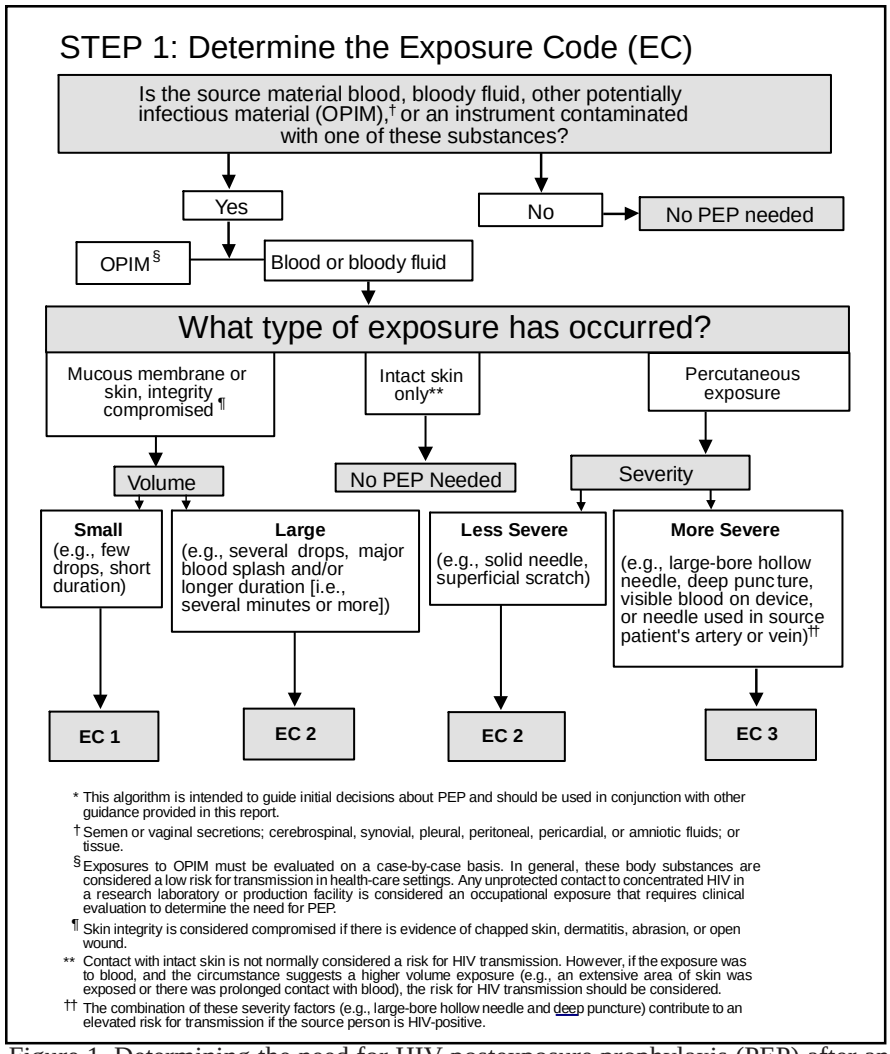


Figure 1. Determining the need for HIV postexposure prophylaxis (PEP) after an occupational exposure Step 1:*

Exposure Report

If an occupational exposure occurs, the circumstances and postexposure management should be recorded in the HCW's confidential medical record (usually on a form the facility designates for this purpose). Relevant information includes

- date and time of exposure;
- details of the procedure being performed, including where and how

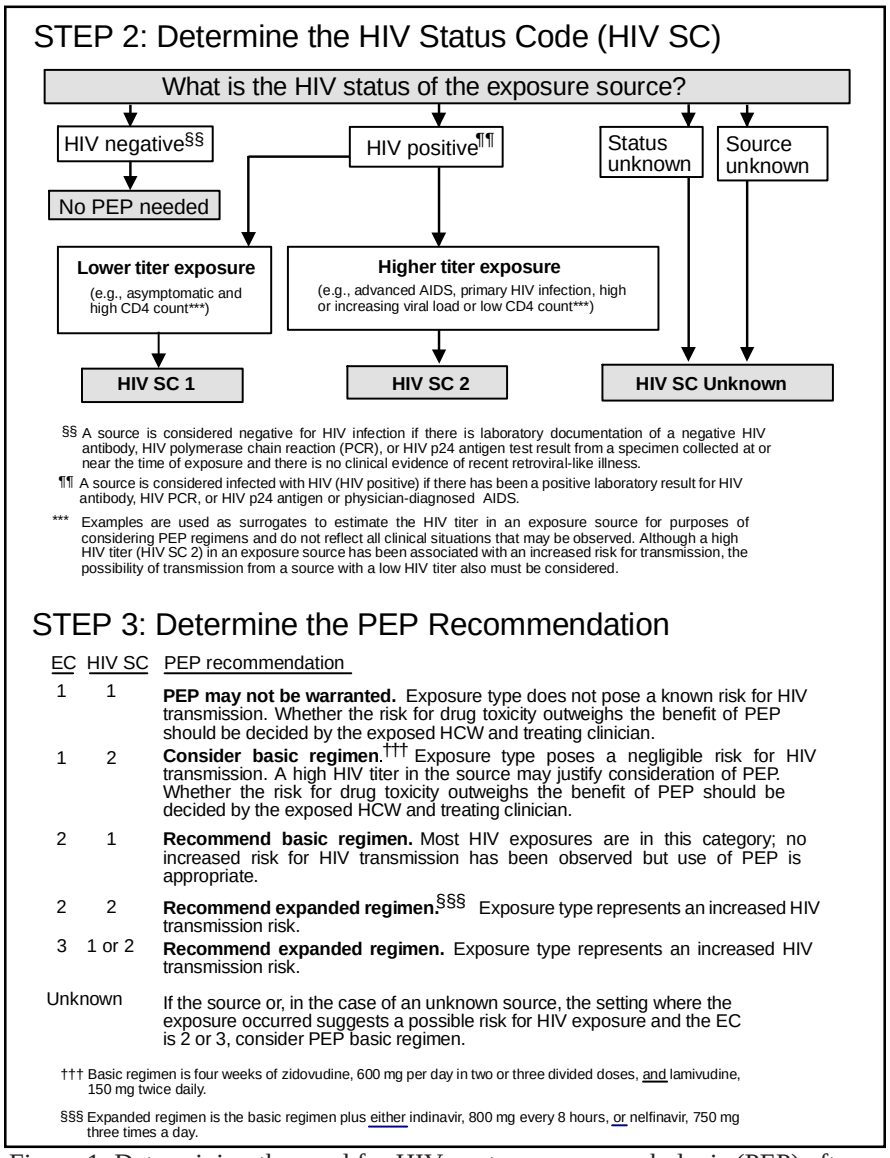


Figure 1. Determining the need for HIV postexposure prophylaxis (PEP) after an occupational exposure Steps 2 and 3:*

the exposure occurred, and if the exposure was related to a sharp device, the type of device and how and when in the course of handling the device the exposure occurred;

- details of the exposure, including the type and amount of fluid or material and the severity of the exposure (e.g., for a percutaneous exposure, depth of injury and whether fluid was injected; or for a skin or mucous-membrane exposure, the estimated volume of material and duration of contact and the condition of the skin [e.g., chapped, abraded, or intact]);
- details about the exposure source (i.e., whether the source material contained HIV or other bloodborne pathogen[s]), and if the source is an HIV-infected person, the stage of disease, history of antiretroviral therapy, and viral load, if known; and
- details about counseling, postexposure management, and follow-up.

Exposure Management

Treatment of an Exposure Site

Wounds and skin sites that have been in contact with blood or body fluids should be washed with soap and water; mucous membranes should be flushed with water. There is no evidence that the use of antiseptics for wound care or expressing fluid by squeezing the wound further reduces the risk for HIV transmission. However, the use of antiseptics is not contraindicated. The application of caustic agents (e.g., bleach) or the injection of antiseptics or disinfectants into the wound is not recommended.

Assessment of Infection Risk

After an occupational exposure, the source-person and the exposed HCW should be evaluated to determine the need for HIV PEP. Follow-up for hepatitis B virus and hepatitis C virus infections also should be conducted in accordance with previously published CDC recommendations (98,99).

Evaluation of exposure. The exposure should be evaluated for potential to transmit HIV based on the type of body substance involved and the route and severity of the exposure. Exposures to blood, fluid containing visible blood, or other potentially infectious fluid (including semen; vaginal secretions; and cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids) or tissue through a percutaneous injury (i.e., needlestick or other penetrating sharps-related event) or through contact with a mucous membrane are situations that pose a risk for bloodborne transmission and require further evaluation (Figure 1). In addition, any direct contact (i.e., personal protective equipment either was not used or was ineffective in protecting skin or mucous membranes) with concentrated HIV in a research laboratory or production facility is considered an exposure that requires clinical evaluation to assess the need for PEP.

For skin exposures, follow-up is indicated if it involves direct contact with a body fluid listed above and there is evidence of compromised skin integrity (e.g., dermatitis, abrasion, or open wound). However, if the contact is prolonged or involves a large area of intact skin, postexposure follow-up may

(continued on page 14)

(continued from page 13)
be considered on a case-by-case basis or if requested by the HCW.

For human bites, the clinical evaluation must consider possible exposure of both the bite recipient and the person who inflicted the bite. HIV transmission only rarely has been reported by this route (100,101; CDC, unpublished data, 1998). If a bite results in blood exposure to either person involved, postexposure follow-up, including consideration of PEP, should be provided.

Evaluation and testing of an exposure source. The person whose blood or body fluids are the source of an occupational exposure should be evaluated for HIV infection. Information available in the medical record at the time of exposure (e.g., laboratory test results, admitting diagnosis, or past medical history) or from the source person may suggest or rule out possible HIV infection. Examples of information to consider when evaluating an exposure source for possible HIV infection include laboratory information (e.g., prior HIV testing results or results of immunologic testing [e.g., CD4+ count]), clinical symptoms (e.g., acute syndrome suggestive of primary HIV infection or undiagnosed immunodeficiency disease), and history of possible HIV exposures (e.g., injecting-drug use, sexual contact with a known HIV-positive partner, unprotected sexual contact with multiple partners [heterosexual and/or homosexual], or receipt of blood or blood products before 1985).

If the source is known to have HIV infection, available information about this person's stage of infection (i.e., asymptomatic or AIDS), CD4+ T-cell count, results of viral load testing, and current and previous antiretroviral therapy, should be gathered for consideration in choosing an appropriate PEP regimen. If this information is not immediately available, initiation of PEP, if indicated, should not be delayed; changes in the PEP regimen can be made after PEP has been started, as appropriate.

If the HIV serostatus of the source person is unknown, the source person should be informed of the incident and, if consent is obtained, tested for serologic evidence of HIV infection. If consent cannot be obtained (e.g., patient is unconscious), procedures should be followed for testing source persons according to applicable state and local laws. Confidentiality of the source person should be maintained at all times.

HIV-antibody testing of an exposure source should be performed as soon as possible. Hospitals, clinics, and other sites that manage exposed HCWs should consult their laboratories regarding the most appropriate test to use to expedite these results. An FDA-approved rapid HIV-antibody test kit should be considered for use in this situation, particularly if testing by enzyme immunoassay (EIA) cannot be completed within 24–48 hours. Repeatedly reactive results by EIA or rapid HIV-antibody tests are considered highly suggestive of infection, whereas a negative result is an excellent indicator of the absence of HIV antibody. Confirmation of a reactive result by Western blot or immunofluorescent antibody is not necessary for making initial decisions about postexposure management but should be done to complete the testing process.

If the source is HIV seronegative and has no clinical evidence of acquired immunodeficiency syndrome (AIDS) or symptoms of HIV infection, no further testing of the source is indicated. It is unclear whether follow-up testing of a source who is HIV negative at the time of exposure, but recently (i.e., within the last 3–6 months) engaged in behaviors that pose a risk for HIV transmission, is useful in postexposure management of HCWs; HCWs who become infected generally seroconvert before repeat testing of a source would normally be performed.

If the exposure source is unknown, information about where and under what circumstances the exposure occurred should be assessed epidemiologically for risk for transmission of HIV. Certain situations, as well as the type of exposure, may suggest an increased or decreased risk; an important consideration is the prevalence of HIV in the population group (i.e., institution or community) from which the contaminated source material is derived. For example, an exposure that occurs in a geographic area where injecting-drug use is prevalent or on an AIDS unit in a health-care facility would be considered epidemiologically to have a higher risk for transmission than one that occurs in a nursing home for the elderly where no known HIV-infected residents are present. In addition, exposure to a blood-filled hollow needle or visibly bloody device suggests a higher-risk exposure than exposure to a needle that was most likely used for giving an injection. Decisions regarding appropriate management should be individualized based on the risk assessment.

HIV testing of needles or other sharp instruments associated with an exposure, regardless of whether the source is known or unknown, is not recommended. The reliability and interpretation of findings in such circumstances are unknown.

Clinical Evaluation and Baseline Testing of Exposed HCWs

Exposed HCWs should be evaluated for susceptibility to bloodborne pathogen infections. Baseline testing (i.e., testing to establish serostatus at the time of exposure) for HIV antibody should be performed. If the source person is seronegative for HIV, baseline testing or further follow-up of the HCW normally is not necessary. If the source person has recently engaged in behaviors that are associated with a risk for HIV transmission, baseline and follow-up HIV-antibody testing (e.g., 3 and/or 6 months postexposure) of the HCW should be considered. Serologic testing should be made available to all HCWs who are concerned that they may have been exposed to HIV.

(continued on page 27)

1998 Guidelines for Treatment of Sexually Transmitted Diseases

(Continued from the January-February and March-April 1998 issues of the *Missouri Epidemiologist*)

Physicians and other health-care providers have a critical role in preventing and treating sexually transmitted diseases (STDs). The following recommendations for the treatment of STDs, which were developed by the Centers for Disease Control and Prevention (CDC) in consultation with a group of outside experts, are intended to assist with that effort.

The recommendations, which update those released by CDC in 1993, were reprinted from CDC's *Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports*, Vol. 47, No. RR-1, January 23, 1998. This issue of the *Missouri Epidemiologist* contains those sections of the guidelines which relate to human immunodeficiency virus (HIV) infection and human papillomavirus (HPV) infection. Those sections relating to diseases characterized by urethritis and cervicitis were reprinted in the January-February 1998 issue and diseases characterized by genital ulcers and congenital syphilis in the March-April 1998 issue.

A full copy of the guidelines and reference list in pdf format can be found on CDC's Division of STD Prevention Home Page at **http://www.cdc.gov/nchstp/dstd/dstdp.htm.**

If you have questions regarding these guidelines, please contact DOH's Bureau of STD/HIV Prevention at (573) 751-6141.

Additional information for medical providers on STDs and STD training courses is available on the Internet at the following sites:

CDC's Division of STD Prevention:
http://www.cdc.gov/nchstp/dstd/dstdp.html

CDC's Division of HIV/AIDS Prevention:
http://www.cdc.gov/nchstp/hiv_aids/dhap.htm

CDC's Division of AIDS, STD, and TB Laboratory Research:
http://www.cdc.gov/ncidod/dastlr/dastlr.html

National Network of STD/HIV Prevention Training Centers:
http://129.137.232.101/STDPTC.html

St. Louis STD/HIV Prevention Training Center:
http://www.umsl.edu/services/itc/std_ptc.html
Ph: (314) 747-0294 or 747-1522

Medline - National Library of Medicine:
http://igm.nlm.nih.gov/

Human Immunodeficiency Virus (HIV) Infection

Human Papillomavirus (HPV) Infection

Human Immunodeficiency Virus (HIV) Infection

DETECTION, INITIAL MANAGEMENT AND REFERRAL

Infection with HIV produces a spectrum of disease that progresses from a clinically latent or asymptomatic state to AIDS as a late manifestation. The pace of disease progression is variable. The time between infection with HIV and the development of AIDS ranges from a few months to as long as 17 years (median: 10 years). Most adults and adolescents infected with HIV remain symptom-free for long periods, but viral replication is active during all stages of infection, increasing substantially as the immune system deteriorates. AIDS eventually develops in almost all HIV-infected persons; in one study of HIV-infected adults, AIDS developed in 87% (95% confidence interval [CI]=83%–90%) within 17 years after infection. Additional cases are expected to occur among those who have remained AIDS-free for longer periods.

Greater awareness among both patients and health-care providers of the risk factors associated with HIV transmission has led to increased testing for HIV and earlier diagnosis of the infection, often before symptoms develop. The early diagnosis of HIV infection is important for several reasons. Treatments are available to slow the decline of immune system function. HIV-infected persons who have altered immune function are at increased risk for infections for which preventive measures are available (e.g., *Pneumocystis carinii* pneumonia [PCP], toxoplasmic encephalitis [TE], disseminated *Mycobacterium avium* complex [MAC] disease, tuberculosis [TB], and bacterial pneumonia). Because of its effect on the immune system, HIV affects the diagnosis, evaluation, treatment, and follow-up of many other diseases and may affect the efficacy of antimicrobial therapy for some STDs. Finally, the early diagnosis of HIV enables the health-care provider to counsel such patients and to assist in preventing HIV transmission to others.

Proper management of HIV infection involves a complex array of behavioral, psychosocial, and medical services. Although some of these services may be available in the STD treatment facility, other services, particularly medical services, are usually unavailable in this setting. Therefore, referral to a health-care provider or facility experienced in caring for HIV-infected patients is advised. Staff in STD treatment facilities should be knowledgeable about the options for referral available in their communities. While in the STD treatment facility, the HIV-infected patient should be educated about HIV infection and the various options for HIV care that are available. Because of the complexity of services required for management of HIV infection, detailed information, particularly regarding medical care, is beyond the scope of this report and may be found elsewhere (3,5,10,11). Rather, this section provides information on diagnostic testing for HIV-1 and HIV-2, counseling patients who have HIV infection, and preparing the HIV-infected patient for what to expect when medical care is necessary. Information also is provided on management of sex partners, because such services can and should be provided in the STD treatment facility before referral. Finally, the topics of HIV infection during pregnancy and in infants and children are addressed.

Diagnostic Testing for HIV-1 and HIV-2

Testing for HIV should be offered to all persons whose behavior puts them at risk for infection, including persons who seek evaluation and treatment for STDs. Counseling before and after testing (i.e., pretest and posttest counseling) is an integral part of the testing procedure (see HIV Prevention Counseling). Informed consent must be obtained before an HIV test is performed. Some states require written consent.

HIV infection usually is diagnosed by using HIV-1 antibody tests. Antibody testing begins with a sensitive screening test such as the enzyme immunoassay (EIA). Reactive screening tests must be confirmed by a supplemental test, such as the Western blot (WB) or an immunofluorescence assay (IFA). If confirmed by a supplemental test, a positive antibody test result indicates that a person is infected with HIV and is capable of transmitting the virus to others. HIV antibody is detectable in at least 95% of patients within 6 months after infection. Although a negative antibody test result usually indicates that a person is not infected, antibody tests cannot exclude infection that occurred <6 months before the test.

The prevalence of HIV-2 in the United States is extremely low, and CDC does not recommend routine testing for HIV-2 in settings other than blood centers, unless demographic or behavioral information indicates that HIV-2 infection might be present. Those at risk for HIV-2 infection include persons from a country in which HIV-2 is endemic or the sex partners of such persons. HIV-2 is endemic in parts of West Africa, and an increased prevalence of HIV-2 has been reported in Angola, France, Mozambique, and Portugal. In addition, testing for HIV-2 should be conducted when there is clinical evidence or suspicion of HIV disease in the absence of a positive test for antibodies to HIV-1 (12).

Because HIV antibody crosses the placenta, its presence in a child aged <18 months is not diagnostic of HIV infection (see Special Considerations, HIV Infection in Infants and Children).

The following are specific recommendations for diagnostic testing for HIV infection:

- Informed consent must be obtained before an HIV test is performed. Some states require written consent. (See HIV Prevention Counseling for a discussion of pretest and posttest counseling.)
- Positive screening tests for HIV antibody must be confirmed by a more specific confirmatory test (either WB or IFA) before being considered diagnostic of HIV infection.
- Patients who have positive HIV test results must either receive behavioral, psychosocial, and medical evaluation and monitoring services or be referred for these services.

Acute Retroviral Syndrome

Health-care providers should be alert for the symptoms and signs of acute retroviral syndrome, which is characterized by fever, malaise, lymphadenopathy, and skin rash. This syndrome frequently occurs in the first few weeks after HIV infection, before antibody test results become positive. Suspicion of acute retroviral syndrome should prompt nucleic acid testing to detect the presence of HIV. Recent data indicate that initiation of antiretroviral therapy during this period can delay the onset of HIV-related complications and might influence prognosis. If testing reveals acute HIV infection, health-care providers should either counsel the patient about immediate initiation of antiretroviral therapy or refer the patient for emergency expert consultation. The optimal antiretroviral regimen at this time is unknown. Treatment with zidovudine can delay the onset of HIV-related complications; however, most experts recommend treatment with two nucleoside reverse transcriptase inhibitors and a protease inhibitor.

Counseling for HIV-Infected Patients

Behavioral and psychosocial services are an integral part of health care for HIV-infected patients; such services should be available on-site or through referral when HIV infection is diagnosed. Patients often are distressed when first informed of a positive HIV test result. Such patients face several major adaptive challenges: a) accepting the possibility of a shortened life span, b) coping with others' reactions to a stigmatizing illness, c) developing and adopting strategies for maintaining physical and emotional health, and d) initiating changes in behavior to prevent HIV transmission to others. Many patients also require assistance with making reproductive choices, gaining access to health services, and confronting employment or housing discrimination.

Interrupting HIV transmission depends on behavioral changes made by those persons at risk for transmitting or acquiring infection. Infected persons, as potential sources of new infections, must receive additional counseling and assistance to support partner notification and counseling to prevent infection of others. Targeting behavior change programs toward HIV-infected persons and their sex partners, or those with whom they share injecting-drug equipment, is an important adjunct to AIDS prevention efforts.

The following are specific recommendations for counseling HIV-infected patients:

- Persons who test positive for HIV antibody should be counseled by a person or persons, either on-site or through referral, who can discuss the behavioral, psychosocial, and medical implications of HIV infection.
- Appropriate social support and psychological resources should be available, either on-site or through referral, to assist patients in coping with emotional distress.
- Persons who continue to be at risk for transmitting HIV should receive assistance in changing or avoiding behaviors that can transmit infection to others.

Planning for Medical Care and for Continuation of Psychosocial Services

Practice settings for offering HIV care differ depending on local resources and needs. Primary-care providers and outpatient facilities must ensure that appropriate resources are available for each patient and must avoid fragmentation of care as much as possible. A single source that is able to provide comprehensive care for all stages of HIV infection is preferred; however, the limited availability of such resources often results in the need to coordinate care among outpatient, inpatient, and specialist providers in different locations. Providers should do everything possible to avoid fragmentation of care and long delays between diagnosis of HIV infection and access to medical and psychosocial services.

Recently identified HIV infection may not have been recently acquired. Persons newly diagnosed with HIV may be at any of the different stages of infection. Therefore, the health-care provider should be alert for symptoms or signs that suggest advanced HIV infection (e.g., fever, weight loss, diarrhea, cough, shortness of breath, and oral candidiasis). The presence of any of these symptoms should prompt urgent referral for medical care. Similarly, the provider should be alert for signs of severe psychologic distress and be prepared to refer the client accordingly.

HIV-infected patients in the STD treatment setting should be educated about what to expect when medical care is necessary (11). In the nonemergent situation, the initial evaluation of the HIV-positive patient usually includes the following components:

- A detailed medical history, including sexual and substance-abuse history, previous STDs, and specific HIV-related symptoms or diagnoses.
- A physical examination; for women, this should include a gynecologic examination.
- For women, testing for *N. gonorrhoeae* and *C. trachomatis*, a Pap smear, and wet mount examination of vaginal secretions.
- Complete blood and platelet counts and blood chemistry profile.
- Toxoplasma antibody test, tests for hepatitis B viral markers, and syphilis serology.
- A CD4+ T-lymphocyte analysis and determination of HIV plasma ribonucleic acid (i.e., HIV viral load).
- A tuberculin skin test (TST) (sometimes referred to as a purified protein derivative [PPD] skin test) administered by the Mantoux method. The test result should be evaluated at 48–72 hours; in HIV-infected persons, a 5 mm induration is considered positive. The usefulness of anergy testing is controversial (13–15).
- A chest radiograph.
- A thorough psychosocial evaluation, including ascertainment of behavioral factors indicating risk for transmitting HIV and elucidation of information concerning any partners who should be notified about possible exposure to HIV.

In subsequent visits, once the results of laboratory and skin tests are available, the patient may be offered antiretroviral therapy (16), as well as specific medications to reduce the incidence of opportunistic infections (e.g., PCP, TE, disseminated MAC infection, and TB) (10,14,17–19). Hepatitis B vaccination should be offered to patients who do not have hepatitis B markers, influenza vaccination should be offered annually, and pneumococcal vaccination should be administered. For additional information concerning vaccination of HIV-infected patients, refer to "Recommendations of the Advisory Committee on Immunization Practices (ACIP): Use of Vaccines and Immune Globulins in Persons with Altered Immunocompetence" (20).

Specific recommendations for planning medical care and continuation of psychosocial services include the following:

- HIV-infected persons should be referred for appropriate follow-up to facilities in which health-care personnel are experienced in providing care for HIV-infected patients.
- Health-care providers should be alert for medical or psychosocial conditions that require immediate attention.
- Patients should be educated about what to expect in follow-up medical care.

Management of Sex Partners and Injecting-Drug Partners

When referring to persons who are infected with HIV, the term "partner" includes not only sex partners but also injecting-drug users who share syringes or other injection equipment. The rationale for partner notification is that the early diagnosis and treatment of HIV infection possibly reduces morbidity and provides the opportunity to encourage risk-reducing behaviors. Partner notification for HIV infection must be confidential and will depend on voluntary cooperation of the patient.

Two complementary notification processes, patient referral and provider referral, can be used to identify partners. With patient referral, patients directly inform their partners of their exposure to HIV infection. With provider referral, trained health department personnel locate partners on the basis of the names, descriptions, and addresses provided by the patient. During the notification process, the anonymity of patients is protected; their names are not revealed to partners who are notified. Many state health departments provide assistance, if requested, with provider-referral partner notification.

The results of one randomized trial suggested that provider referral is more effective in notifying partners than patient referral. In that study, 50% of partners in the provider-referral group were notified, compared with 7% of partners notified by persons in the patient-referral group. However, whether behavioral change takes place as a result of partner notification has not been determined, and many patients are reluctant to disclose the names of partners because of concern about discrimination, disruption of relationships, loss of confidentiality for the partners, and possible violence.

The following are specific recommendations for implementing partner-notification procedures:

- HIV-infected patients should be encouraged to notify their partners and to refer them for counseling and testing. If requested by the patient, health-care providers should assist in this process, either directly or by referral to health department partner-notification programs.
- If patients are unwilling to notify their partners, or if they cannot ensure that their partners will seek counseling, physicians or health department personnel should use confidential procedures to notify the partners.

Special Considerations

Pregnancy

All pregnant women should be offered HIV testing as early in pregnancy as possible (21). This recommendation is particularly important because of the available treatments for reducing the likelihood of perinatal transmission and maintaining the health of the woman. HIV-infected women should be informed specifically about the risk for perinatal infection. Current evidence indicates that 15%–25% of infants born to untreated HIV-infected mothers are infected with HIV; the virus also can be transmitted from an infected mother by breastfeeding. Zidovudine (ZDV) reduces the risk for HIV transmission to the infant from approximately 25% to 8% if administered to women during the later stage of pregnancy and during labor and to infants for the first 6 weeks of life (22). Therefore, ZDV treatment should be offered to all HIV-infected pregnant women. In the United States, HIV-infected women should be advised not to breastfeed their infants.

Insufficient information is available regarding the safety of ZDV or other antiretroviral drugs during early pregnancy; however, on the basis of the ACTG-076 protocol,* ZDV is indicated for the prevention of maternal-fetal HIV transmission as part of a regimen that includes oral ZDV at 14–34 weeks of gestation, intravenous (IV) ZDV during labor, and ZDV Syrup to the neonate after birth (22). Glaxo Wellcome, Inc., Hoffmann-LaRoche, Inc., Bristol-Myers Squibb, Co., and Merck & Co., Inc., in cooperation with CDC, maintain a registry to assess the safety of ZDV, didanosine (ddI), lamivudine (3TC), saquinavir (SAQ), stavudine (d4t), and dideoxycytodine (ddC) during pregnancy. Women who receive any of these drugs during pregnancy should be reported to this registry; telephone (800) 722-9292, extension 38465. The number of cases reported through February 1997 represented a sample of insufficient size for reliably estimating the risk for birth defects after administration of ddI, 3TC, SAQ, d4t, ddC, or ZDV, or their combination, to pregnant women and their fetuses. However, the registry findings did not indicate an increase in the number of birth defects after receipt of only ZDV in comparison with the number expected in the U.S. population. Furthermore, no consistent pattern of birth defects has been observed that would suggest a common cause.

*The Acquired Immunodeficiency Syndrome (AIDS) Clinical Trials Group Protocol 076, a clinical trial sponsored by the National Institutes of Health in collaboration with the National Institute of Health and Medical Research and the National Agency of Research on AIDS in France.

Women should be counseled about their options regarding pregnancy. The objective of counseling is to provide HIV-infected women with information for making reproductive decisions, analogous to the model used in genetic counseling. In addition, contraceptive counseling should be offered to HIV-infected women who do not desire pregnancy. Prenatal and abortion services should be available on-site or by referral. Pregnancy among HIV-infected women does not appear to increase maternal morbidity or mortality.

HIV Infection in Infants and Children

HIV-infected infants and young children differ from adults and adolescents with respect to the diagnosis, clinical presentation, and management of HIV disease. For example, because of transplacental passage of maternal HIV antibody, both infected and uninfected infants born to HIV-infected mothers are expected to have positive HIV-antibody test results. A definitive determination of HIV infection in a child <18 months of age should be based on laboratory evidence of HIV in blood or tissues by culture, nucleic acid, or antigen detection. In addition, CD4+ lymphocyte counts are higher in infants and children aged <5 years than in healthy adults and must be interpreted accordingly. All infants born to HIV-infected mothers should begin PCP prophylaxis at age 4–6 weeks; such prophylaxis should be continued until HIV infection has been excluded (18). Other modifications must be made in health services that are recommended for infants and children, such as avoiding vaccination with live oral polio vaccine when a child (or household contact) is infected with HIV. Management of infants, children, and adolescents who are known or suspected to be infected with HIV requires referral to physicians familiar with the manifestations and treatment of pediatric HIV infection.

Human Papillomavirus (HPV) Infection

GENITAL WARTS

More than 20 types of HPV can infect the genital tract. Most HPV infections are asymptomatic, subclinical, or unrecognized. Visible genital warts usually are caused by HPV types 6 or 11. Other HPV types in the anogenital region (i.e., types 16, 18, 31, 33, and 35) have been strongly associated with cervical dysplasia. Diagnosis of genital warts can be confirmed by biopsy, although biopsy is rarely needed (e.g., if the diagnosis is uncertain; the lesions do not respond to standard therapy; the disease worsens during therapy; the patient is immunocompromised; or warts are pigmented, indurated, fixed, and ulcerated). No data support the use of type-specific HPV nucleic acid tests in the routine diagnosis or management of visible genital warts.

HPV types 6 and 11 also can cause warts on the uterine cervix and in the vagina, urethra, and anus; these warts are sometimes symptomatic. Intra-anal warts are seen predominately in patients who have had receptive anal intercourse; these warts are distinct from perianal warts, which can occur in men and women who do not have a history of anal sex. Other than the genital area, these HPV types have been associated with conjunctival, nasal, oral, and laryngeal warts. HPV types 6 and 11 are associated rarely with invasive squamous cell carcinoma of the external genitalia. Depending on the size and anatomic locations, genital warts can be painful, friable, and/or pruritic.

HPV types 16, 18, 31, 33, and 35 are found occasionally in visible genital warts and have been associated with external genital (i.e., vulvar, penile, and anal) squamous intraepithelial neoplasia (i.e., squamous cell carcinoma in situ, bowenoid papulosis, Erythroplasia of Queyrat, or Bowen's disease of the genitalia). These HPV types have been associated with vaginal, anal, and cervical intraepithelial dysplasia and squamous cell carcinoma. Patients who have visible genital warts can be infected simultaneously with multiple HPV types.

Treatment

The primary goal of treating visible genital warts is the removal of symptomatic warts. Treatment can induce wart-free periods in most patients. Genital warts often are asymptomatic. No evidence indicates that currently available treatments eradicate or affect the natural history of HPV infection. The removal of warts may or may not decrease infectivity. If left untreated, visible genital warts may resolve on their own, remain unchanged, or increase in size or number. No evidence indicates that treatment of visible warts affects the development of cervical cancer.

Regimens

Treatment of genital warts should be guided by the preference of the patient, the available resources, and the experience of the health-care provider. None of the available treatments is superior to other treatments, and no single treatment is ideal for all patients or all warts.

The available treatments for visible genital warts are patient-applied therapies (i.e., podofilox and imiquimod) and provider-administered therapies (i.e., cryotherapy, podophyllin resin, trichloroacetic acid [TCA], bichloroacetic acid [BCA], interferon, and surgery). Most patients have from one to 10 genital warts, with a total wart area of 0.5–1.0 cm^2, that are responsive to most treatment modalities. Factors that might influence selection of treatment include wart size, wart number, anatomic site of wart, wart morphology, patient preference, cost of treatment, convenience, adverse effects, and provider experience. Having a treatment plan or protocol is important, because many patients will require a course of therapy rather than a single treatment. In general, warts located on moist surfaces and/or in intertriginous areas respond better to topical treatment (e.g., TCA, podophyllin, podofilox, and imiquimod) than do warts on drier surfaces.

The treatment modality should be changed if a patient has not improved substantially after three provider-administered treatments or if warts have not completely cleared after six treatments. The risk-benefit ratio of treatment should be evaluated throughout the course of therapy to avoid overtreatment. Providers should be knowledgeable about, and have available to them, at least one patient-applied and one provider-administered treatment.

Complications rarely occur if treatments for warts are employed properly. Patients should be warned that scarring in the form of persistent hypopigmentation or hyperpigmentation is common with ablative modalities. Depressed or hypertrophic scars are rare but can occur, especially if the patient has had insufficient time to heal between treatments. Treatment can result rarely in disabling chronic pain syndromes (e.g., vulvodynia or hyperesthesia of the treatment site).

External Genital Warts, Recommended Treatments

Patient-Applied:

Podofilox 0.5% solution or gel. Patients may apply podofilox solution with a cotton swab, or podofilox gel with a finger, to visible genital warts twice a day for 3 days, followed by 4 days of no therapy. This cycle may be repeated as necessary for a total of four cycles. The total wart area treated should not exceed 10 cm^2, and a total volume of podofilox should not exceed 0.5 mL per day. If possible, the health-care provider should apply the initial treatment to demonstrate the proper application technique and identify which warts should be treated. *The safety of podofilox during pregnancy has not been established.*

OR

Imiquimod 5% cream. Patients should apply imiquimod cream with a finger at bedtime, three times a week for as long as 16 weeks. The treatment area should be washed with mild soap and water 6–10 hours after the application. Many patients may be clear of warts by 8–10 weeks or sooner. *The safety of imiquimod during pregnancy has not been established.*

Provider-Administered:

Cryotherapy with liquid nitrogen or cryoprobe. Repeat applications every 1 to 2 weeks.

OR

Podophyllin resin 10%–25% in compound tincture of benzoin. A small amount should be applied to each wart and allowed to air dry. To avoid the possibility of complications associated with systemic absorption and toxicity, some experts recommend that application be limited to ≤0.5 mL of podophyllin or ≤10 cm^2 of warts per session. Some experts suggest that the preparation should be thoroughly washed off 1–4 hours after application to reduce local irritation. Repeat weekly if necessary. *The safety of podophyllin during pregnancy has not been established.*

OR

TCA or BCA 80%–90%. Apply a small amount only to warts and allow to dry, at which time a white "frosting" develops; powder with talc or sodium bicarbonate (i.e., baking soda) to remove unreacted acid if an excess amount is applied. Repeat weekly if necessary.

OR

Surgical removal either by tangential scissor excision, tangential shave excision, curettage, or electrosurgery.

External Genital Warts, Alternative Treatments

Intralesional interferon,

OR

Laser surgery.

For patient-applied treatments, patients must be able to identify and reach warts to be treated. Podofilox 0.5% solution or gel is relatively inexpensive, easy to use, safe, and self-applied by patients. Podofilox is an antimitotic drug that results in destruction of warts. Most patients experience mild/moderate pain or local irritation after treatment. Imiquimod is a topically active immune enhancer that stimulates production of interferon and other cytokines. Before wart resolution, local inflammatory reactions are common; these reactions usually are mild to moderate.

Cryotherapy, which requires the use of basic equipment, destroys warts by thermal-induced cytolysis. Its major drawback is that proper use requires substantial training, without which warts are frequently overtreated or undertreated, resulting in poor efficacy or increased likelihood of complications. Pain after application of the liquid nitrogen, followed by necrosis and sometimes blistering, are not unusual. Although local anesthesia (topical or injected) is not used routinely, its use facilitates treatment if there are many warts or if the area of warts is large.

Podophyllin resin contains a number of compounds, including the podophyllin lignans that are antimitotic. The resin is most frequently compounded at 10%–25% in tincture of benzoin. However, podophyllin resin preparations differ in the concentration of active components and contaminants. The shelf life and stability of podophyllin preparations are unknown. It is important to apply a thin layer of podophyllin resin to the warts and allow it to air dry before the treated area comes into contact with clothing. Overapplication or failure to air dry can result in local irritation caused by spread of the compound to adjacent areas.

Both TCA and BCA are caustic agents that destroy warts by chemical coagulation of the proteins. Although these preparations are widely used, they have not been investigated thoroughly. TCA solutions have a low viscosity comparable to water and can spread rapidly if applied excessively, thus damaging adjacent normal tissue. Both TCA and BCA should be applied sparingly and allowed to dry before the patient sits or stands. If pain is intense, the acid can be neutralized with soap or sodium bicarbonate (i.e., baking soda).

Surgical removal of warts has an advantage over other treatment modalities in that it renders the patient wart-free, usually with a single visit. However, substantial clinical training, additional equipment, and a longer office visit are required. Once local anesthesia is achieved, the visible genital warts can be physically destroyed by electrosurgery, in which case no additional hemostasis is required. Alternatively, the warts can be removed either by tangential excision with a pair of fine scissors or a scalpel or by curettage. Because most warts are exophytic, this can be accomplished with a resulting wound that only extends into the upper dermis. Hemostasis can be achieved with an electrosurgical unit or a chemical styptic (e.g., an aluminum chloride solution). Suturing is neither required nor indicated in most cases when surgical removal is done properly. Surgery is most beneficial for patients who have a large number or area of genital warts. Carbon dioxide laser and surgery may be useful in the management of extensive warts or intraurethral warts, particularly for those patients who have not responded to other treatments.

Interferons, either natural or recombinant, used for the treatment of genital warts have been administered systemically (i.e., subcutaneously at a distant site or IM) and intralesionally (i.e., injected into the warts). Systemic interferon is not effective. The efficacy and recurrence rates of intralesional interferon are comparable to other treatment modalities. Interferon is believed to be effective because of antiviral and/or immunostimulating effects. However, interferon therapy is not recommended for routine use because of inconvenient routes of administration, frequent office visits, and the association between its use and a high frequency of systemic adverse effects.

Because of the shortcomings of available treatments, some clinics employ combination therapy (i.e., the simultaneous use of two or more modalities on the same wart at the same time). Most experts believe that combining modalities does not increase efficacy but may increase complications.

Cervical Warts

For women who have exophytic cervical warts, high-grade squamous intraepithelial lesions (SIL) must be excluded before treatment is begun. Management of exophytic cervical warts should include consultation with an expert.

Vaginal Warts

Cryotherapy with liquid nitrogen. The use of a cryoprobe in the vagina is not recommended because of the risk for vaginal perforation and fistula formation.

OR

TCA or BCA 80%–90% applied only to warts. Apply a small amount only to warts and allow to dry, at which time a white "frosting" develops; powder with talc or sodium bicarbonate (i.e., baking soda) to remove unreacted acid if an excess amount is applied. Repeat weekly if necessary.

OR

Podophyllin 10%–25% in compound tincture of benzoin applied to a treated area that must be dry before the speculum is removed. Treat with ≤2 cm^2 per session. Repeat application at weekly intervals. Because of concern about potential systemic absorption, some experts caution against vaginal application of podophyllin. *The safety of podophyllin during pregnancy has not been established.*

Urethral Meatus Warts

Cryotherapy with liquid nitrogen,

OR

Podophyllin 10%–25% in compound tincture of benzoin. The treatment area must be dry before contact with normal mucosa. Podophyllin must be applied weekly if necessary. *The safety of podophyllin during pregnancy has not been established.*

Anal Warts

Cryotherapy with liquid nitrogen.

OR

TCA or BCA 80%–90% applied to warts. Apply a small amount only to warts and allow to dry, at which time a white "frosting" develops; powder with talc or sodium bicarbonate (i.e., baking soda) to remove unreacted acid if an excess amount is applied. Repeat weekly if necessary.

OR

Surgical removal.

Note: Management of warts on rectal mucosa should be referred to an expert.

Oral Warts

Cryotherapy with liquid nitrogen,

OR

Surgical removal.

Follow-Up

After visible genital warts have cleared, a follow-up evaluation is not mandatory. Patients should be cautioned to watch for recurrences, which occur most frequently during the first 3 months. Because the sensitivity and specificity of self-diagnosis of genital warts is unknown, patients concerned about recurrences should be offered a follow-up evaluation 3 months after treatment. Earlier follow-up visits also may be useful a) to document a wart-free state, b) to monitor for or treat complications of therapy, and c) to provide the opportunity for patient education and counseling. Women should be counseled regarding the need for regular cytologic screening as recommended for women without genital warts. The presence of genital warts is not an indication for cervical colposcopy.

Management of Sex Partners

Examination of sex partners is not necessary for the management of genital warts because the role of reinfection is probably minimal and, in the absence of curative therapy, treatment to reduce transmission is not realistic. However, because self- or partner-examination has not been evaluated as a diagnostic method for genital warts, sex partners of patients who have genital warts may benefit from examination to assess the presence of genital warts and other STDs. Sex partners also might benefit from counseling about the implications of having a partner who has genital warts. Because treatment of genital warts probably does not eliminate the HPV infection, patients and sex partners should be cautioned that the patient might remain infectious even though the warts are gone. The use of condoms

may reduce, but does not eliminate, the risk for transmission to uninfected partners. Female sex partners of patients who have genital warts should be reminded that cytologic screening for cervical cancer is recommended for all sexually active women.

Special Considerations

Pregnancy

Imiquimod, podophyllin, and podofilox should not be used during pregnancy. Because genital warts can proliferate and become friable during pregnancy, many experts advocate their removal during pregnancy. HPV types 6 and 11 can cause laryngeal papillomatosis in infants and children. The route of transmission (i.e., transplacental, perinatal, or postnatal) is not completely understood. The preventive value of cesarean section is unknown; thus, cesarean delivery should not be performed solely to prevent transmission of HPV infection to the newborn. In rare instances, cesarean delivery may be indicated for women with genital warts if the pelvic outlet is obstructed or if vaginal delivery would result in excessive bleeding.

Immunosuppressed Patients

Persons who are immunosuppressed because of HIV or other reasons may not respond as well as immunocompetent persons to therapy for genital warts, and they may have more frequent recurrences after treatment. Squamous cell carcinomas arising in or resembling genital warts might occur more frequently among immunosuppressed persons, requiring more frequent biopsy for confirmation of diagnosis.

Squamous Cell Carcinoma in situ

Patients in whom squamous cell carcinoma in situ of the genitalia is diagnosed should be referred to an expert for treatment. Ablative modalities usually are effective, but careful follow-up is important. The risk for these lesions leading to invasive squamous cell carcinoma of the external genitalia in immunocompetent patients is unknown but is probably low. Female partners of patients who have squamous cell carcinoma in situ are at high risk for cervical abnormalities.

SUBCLINICAL GENITAL HPV INFECTION (WITHOUT EXOPHYTIC WARTS)

Subclinical genital HPV infection occurs more frequently than visible genital warts among both men and women. Infection often is indirectly diagnosed on the cervix by Pap smear, colposcopy, or biopsy and on the penis, vulva, and other genital skin by the appearance of white areas after application of acetic acid. However, the routine use of acetic acid soaks and examination with light and magnification, as a screening test, to detect “subclinical” or “acetowhite” genital warts is not recommended. Acetowhitening is not a specific test for HPV infection. Thus, in populations at low risk for this infection, many false-positives may be detected when this test is used for screening. The specificity and sensitivity of this procedure has not been defined. In special situations, experienced clinicians find this test useful for identification of flat genital warts.

A definitive diagnosis of HPV infection depends on detection of viral nucleic acid (DNA or RNA) or capsid protein. Pap smear diagnosis of HPV does not always correlate with detection of HPV DNA in cervical cells. Cell changes attributed to HPV in the cervix are similar to those of mild dysplasia and often regress spontaneously without treatment. Tests that detect several types of HPV DNA or RNA in cells scraped from the cervix are available, but the clinical utility of these tests for managing patients is unclear. Management decisions should not be made on the basis of HPV tests. Screening for subclinical genital HPV infection using DNA or RNA tests or acetic acid is not recommended.

Treatment

In the absence of coexistent dysplasia, treatment is not recommended for subclinical genital HPV infection diagnosed by Pap smear, colposcopy, biopsy, acetic acid soaking of genital skin or mucous membranes, or the detection of HPV (DNA or RNA). The diagnosis of subclinical genital HPV infection is often questionable, and no therapy has been identified to eradicate infection. HPV has been demonstrated in adjacent tissue after laser treatment of HPV-associated dysplasia and after attempts to eliminate subclinical HPV by extensive laser vaporization of the anogenital area. In the presence of coexistent dysplasia, management should be based on the grade of dysplasia.

Management of Sex Partners

Examination of sex partners is unnecessary. Most sex partners of infected patients probably are already infected subclinically with HPV. No practical screening tests for subclinical infection are available. The use of condoms may reduce transmission to sex partners who are likely to be uninfected (e.g., new partners); however, the period of communicability is unknown. Whether patients who have subclinical HPV infection are as contagious as patients who have exophytic warts is unknown.

Medical providers play a vital role in the prevention and control of sexually transmitted diseases (STDs). Providers can help significantly reduce the occurrence of these diseases by:

- Evaluating each patient, as appropriate, for evidence of STDs, and for evidence of high-risk sexual behaviors.
- Promptly diagnosing and treating patients with STDs according to current guidelines.
- Providing appropriate follow-up after patients have been treated.
- Providing education and counseling to patients engaging in high-risk sexual behaviors.
- Promptly reporting, as required by Missouri law, all cases of chlamydial infection, gonorrhea, syphilis, and hepatitis B to the local health department, or to the Missouri Department of Health (DOH) at (573) 751-6463. Reports of cases of HIV infection/AIDS should be made as follows:
  - Health care providers in St. Louis City and St. Louis County should report the individual to the St. Louis City Department of Health and Hospitals at (314) 658-1159.
  - Providers in the five-county Kansas City metropolitan area should report to the Kansas City Health Department at (816) 983-4200.
  - All other providers should report to DOH's Office of Surveillance at (573) 751-6463.

CORRECTIONS/ADDITIONS

The following corrections/additions should be noted relative to the May-June 1998 issue of the *Missouri Epidemiologist*:

- Table 1 on page 4—The *Staphylococcus aureus* outbreak in a restaurant should have been listed as foodborne.
- Table 2 on page 5—The Legionellosis outbreak should have been listed as airborne. Epidemiologic evidence supports airborne transmission via aerosol-producing devices; other modes are possible, but none has been proven conclusively. Person-to-person transmission has not been documented.
- Sidebar on page 29—The federal government has released updated guidelines for treatment of HIV disease in adults and adolescents. "Guidelines for the Use of Antiretroviral Agents in HIV-infected adults and adolescents (June 17, 1998)" can be found at **http://www.hivatis.org/trtgdlns.html**. The International AIDS Society–USA Panel also released updated recommendations for treatment of HIV disease. "Antiretroviral Therapy for HIV Infection in 1998" can be found at **http://www.ama-assn.org/sci-pubs/journals/archive/jama/vol_280/no_1/jst80004.htm**.
- Table 1 on page 9 contained some errors. We have reprinted a corrected version below.

Table 1. Reporting Criteria for Tick-Borne Diseases
(A confirmed case meets both clinical and laboratory criteria.)

	Ehrlichiosis	Tularemia	Rocky Mountain Spotted Fever	Borelliosis*
Clinical	Tick exposure, acute onset, febrile myalgia, headache, rigor, malaise	Several disease forms, ulceroglandular, intestinal, pneumonic	Tick exposure, acute onset, febrile, myalgia, headache, petichial rash	Characteristic erythematous rash >5 cm in diameter **OR** Chronic manifestations
AND				
Laboratory	Four-fold titer rise in IFA for *E. canis* or *E. chaffeensis* **or** PCR **or** *Intracytoplasmic morulae* + IFA >64	Isolate *F. tularensis* **or** four-fold titer rise for *F. tularensis* antigen	Four-fold titer rise in IFA for *Rickettsia rickettsii* **or** PCR **or** isolate	Isolation of *B. burgdorferi* **or** EIA + Blot** **or** IFA + Blot**

*Lab methods are not decisive in Missouri and are not required for confirmation.
**Blot+ is 2/5 IgM and 5/10 IgG bands

Osteoporosis Prevention and Education

Virginia Beatty
Bureau of Chronic Disease Control

Missouri physicians strive to keep current on the latest technology and treatment options available to their patients in order to ensure quality care. The Department of Health's Missouri Osteoporosis Prevention and Education Program is also dedicated to assuring quality care and keeping physicians and the general public aware of certified technologists, treatment and other information. Therefore, we want to draw your attention to an organization that is dedicated to ensuring quality densitometry screening and lab result interpretation in the diagnosis of osteoporosis. The International Society for Clinical Densitometry (ISCD) is the only organization that currently certifies physicians and technologists. It was founded in 1993 by a multi-disciplinary group of physicians and scientists to fulfill the need for a society dedicated to the practice of bone measurement.

Mission of ISCD

The ISCD is a not-for-profit medical, scientific and professional society. It links multiple disciplines through an international organization dedicated to the clinical and educational aspects of bone densitometry by:

- Enhancing greater knowledge and quality of densitometry among health care professionals,
- Providing continuing education and professional certification for physicians and technologists, and site accreditation for densitometry facilities,
- Increasing patient awareness and access to densitometry, and
- Supporting clinical and scientific advances in the osteoporosis field.

Physicians can help assure that Missourians continue to receive the highest quality of care by pursuing certification and supporting certification of technologists. Being certified brings added credibility to your office, hospital affiliation and third party payers. ISCD has several conferences scheduled in the continental United States that may be of interest to you. See sidebar. For more information, contact ISCD Headquarters, 1200 19th Street NW, Suite 300; Washington, DC 20036-2422; Ph: (202) 828-6056; FAX: (202) 857-1102; E-mail: www.iscd.org.

Osteoporosis Conference Update

ISCD Certification Program
January 14-17, 1999
New Orleans, LA

This professional certification program is a means of qualifying interpreting physicians and densitometry technologists. The program was developed based upon the requests and inquiries of state regulatory agencies, reimbursement authorities, managed care organizations and others with a special interest in the quality delivery of bone measurement services.

Physician Course Content:

- Basic science of bone densitometry
- Principles of operation of commercially available instruments
- Clinical utility of bone density testing
- Interpretation and reporting
- T-, Z-scores and World Health Organization Criteria
- Clinical decision-making using bone mineral density data

Registration:
Space is limited, so register early. To register, you may do so by visiting the website: www.iscd.org or by calling the ISCD Professional Certification and Site Accreditation Office at (503) 288-8323.

Bone Ultrasonometry 3: A Third International Symposium for Clinical Practitioners
April 15-17, 1999
Key West, Florida.

The tentative revisions for the expanded 1999 program include:

- More coverage for current clinical findings, research and oral presentations
- Longer Q&A, roundtable and discussion sessions
- Increased opportunity to "Meet the Manufacturers"
- Integration of ultrasound with other techniques
- More extensive session for basic science, *in-vitro studies* and new technical and instrumentation developments affecting clinical practice
- Clinical quality assurance
- Public health initiatives and education/awareness efforts in the clinical and patient communities
- Case studies and clinical management strategies
- Commercial exhibits

Contact:
Bone Ultrasonometry 3 at FAX: (503) 281-4545 or E-mail: certify@iscd.org.

(continued from page 14)
For purposes of considering HIV PEP, the evaluation also should include information about medications the HCW may be taking and any current or underlying medical conditions or circumstances (i.e., pregnancy, breast feeding, or renal or hepatic disease) that may influence drug selection. Pregnancy testing should be offered to all nonpregnant women of childbearing age whose pregnancy status is unknown.

HIV PEP

The following recommendations apply to situations where an HCW has had an exposure to a source-person with HIV or where information suggests that there is a likelihood that the source-person is HIV-infected. These recommendations are based on the risk for HIV infection after different types of exposure and limited data regarding efficacy and toxicity of PEP. Because most occupational HIV exposures do not result in the transmission of HIV, potential toxicity must be carefully considered when prescribing PEP. When possible, these recommendations should be implemented in consultation with persons having expertise in antiretroviral therapy and HIV transmission.

Explaining PEP to HCWs

Recommendations for chemoprophylaxis should be explained to HCWs who have sustained occupational HIV exposures (Figure 1). For exposures for which PEP is considered appropriate, HCWs should be informed that a) knowledge about the efficacy and toxicity of drugs used for PEP are limited; b) only ZDV has been shown to prevent HIV transmission in humans; c) there are no data to address whether adding other antiretroviral drugs provides any additional benefit for PEP, but experts recommend combination drug regimens because of increased potency and concerns about drug-resistant virus; d) data regarding toxicity of antiretroviral drugs in persons without HIV infection or in pregnant women are limited for ZDV and not known regarding other antiretroviral drugs; and e) any or all drugs for PEP may be declined by the HCW. HCWs who have HIV occupational exposures for which PEP is not recommended should be informed that the potential side effects and toxicity of taking PEP outweigh the negligible risk of transmission posed by the type of exposure.

Factors in Selection of a PEP Regimen

Selection of the PEP regimen should consider the comparative risk represented by the exposure and information about the exposure source, including history of and response to antiretroviral therapy based on clinical response, CD4+ T-lymphocyte counts, viral load measurements, and current disease stage. Most HIV exposures will warrant only a two-drug regimen, using two NRTIs, usually ZDV and 3TC. The addition of a third drug, usually a PI (i.e., IDV or NEL), should be considered for exposures that pose an increased risk for transmission or where resistance to the other drugs used for PEP is known or suspected.

Timing of PEP Initiation

PEP should be initiated as soon as possible. The interval within which PEP should be started for optimal efficacy is not known. Animal studies have demonstrated the importance of starting PEP within hours after an exposure (43,54,56). To assure timely access to PEP, an occupational exposure should be regarded as an urgent medical concern and PEP started as soon as possible after the exposure (i.e., within a few hours rather than days). If there is a question about which antiretroviral drugs to use, or whether to use two or three drugs, it is probably better to start ZDV and 3TC immediately than to delay PEP administration. Although animal studies suggest that PEP probably is not effective when started later than 24–36 hours postexposure (42,55,56), the interval after which there is no benefit from PEP for humans is undefined. Therefore, if appropriate for the exposure, PEP should be started even when the interval since exposure exceeds 36 hours. Initiating therapy after a longer interval (e.g., 1–2 weeks) may be considered for exposures that represent an increased risk for transmission; even if infection is not prevented, early treatment of acute HIV infection may be beneficial (69). The optimal duration of PEP is unknown. Because 4 weeks of ZDV appeared protective in HCWs (2) , PEP probably should be administered for 4 weeks, if tolerated.

PEP if Serostatus of Source Person is Unknown

If the source person's HIV serostatus is unknown at the time of exposure (including when the source is HIV negative but may have had a recent HIV exposure), use of PEP should be decided on a case-by-case basis, after considering the type of exposure and the clinical and/or epidemiologic likelihood of HIV infection in the source (Figure 1). If these considerations suggest a possibility for HIV transmission and HIV testing of the source is pending, it is reasonable to initiate a two-drug PEP regimen until laboratory results have been obtained and later modify or discontinue the regimen accordingly.

PEP if Exposure Source is Unknown

If the exposure source is unknown, use of PEP should be decided on a case-by-case basis. Consideration should include the severity of the exposure and the epidemiologic likelihood that the HCW was exposed to HIV.

PEP for Pregnant HCWs

If the HCW is pregnant, the evaluation of risk and need for PEP should be approached as with any other HCW who has had an HIV exposure. However, the decision to use any antiretroviral drug during pregnancy should involve discussion between the woman and her health-care provider regarding the potential benefits and potential risks to her and her fetus.

(continued on page 28)

(continued from page 27)

Follow-up of HCWs Exposed to HIV

Postexposure Testing

HCWs with occupational exposure to HIV should receive follow-up counseling, postexposure testing, and medical evaluation regardless of whether they receive PEP. HIV-antibody testing should be performed for at least 6 months postexposure (e.g., at 6 weeks, 12 weeks, and 6 months). It is unclear whether an extended follow-up period (e.g., 12 months) is indicated in certain circumstances. Although rare instances of delayed HIV seroconversion have been reported (36,37, J.L. Gerberding, San Francisco General Hospital, unpublished data, May 1997), the infrequency of this occurrence does not warrant adding to HCWs' anxiety by routinely extending the duration of postexposure follow-up. Circumstances for which extending the duration of follow-up have been suggested include the use of highly potent antiretroviral regimens (i.e., more than two drugs) because of theoretical concerns that HIV seroconversion could be delayed, or simultaneous exposure to HCV. Data are insufficient for making a general recommendation in these situations. However, this should not preclude a decision to extend follow-up in an individual situation based on the clinical judgement of the HCW's health-care provider. HIV testing should be performed on any HCW who has an illness that is compatible with an acute retroviral syndrome, regardless of the interval since exposure. HIV-antibody testing using EIA should be used to monitor for seroconversion. The routine use of direct virus assays (e.g., HIV p24 antigen EIA or polymerase chain reaction for HIV RNA) to detect infection in exposed HCWs generally is not recommended (34). Although direct virus assays may detect HIV infection a few days earlier than EIA, the infrequency of HCW seroconversion and increased costs of these tests do not warrant their routine use in this setting. Also, HIV RNA is approved for use in established HIV infection; its reliability in detecting very early infection has not been determined.

Table 1. Basic and expanded postexposure prophylaxis regimens

Regimen category	Application	Drug regimen
Basic	Occupational HIV exposures for which there is a recognized transmission risk (Figure 1).	4 weeks (28 days) of both zidovudine 600 mg every day in divided doses (i.e., 300 mg twice a day, 200 mg three times a day, or 100 mg every 4 hours) **and** lamivudine 150 mg twice a day.
Expanded	Occupational HIV exposures that pose an increased risk for transmission (e.g., larger volume of blood and/or higher virus titer in blood) (Figure 1).	Basic regimen plus **either** indinavir 800 mg every 8 hours **or** nelfinavir 750 mg three times a day.*

*Indinavir should be taken on an empty stomach (i.e., without food or with a light meal) and with increased fluid consumption (i.e., drinking six 8 oz glasses of water throughout the day); nelfinavir should be taken with meals.

Monitoring and Management of PEP Toxicity

If PEP is used, drug-toxicity monitoring should be performed at baseline and again 2 weeks after starting PEP. Clinical judgement, based on medical conditions that may exist in the HCW and any toxicity associated with drugs included in the PEP regimen, should determine the scope of testing. Minimally these should include a complete blood count and renal and hepatic chemical function tests. Monitoring for evidence of hyperglycemia should be included for HCWs whose regimen includes any PI; if the HCW is receiving IDV, monitoring for crystalluria, hematuria, hemolytic anemia, and hepatitis also should be included. If toxicity is noted, modification of the regimen should be considered after expert consultation; further diagnostic studies may be indicated.

HCWs who fail to complete the recommended regimen often do so because of the side effects they experience (e.g., nausea and diarrhea). These symptoms often can be managed without changing the regimen by prescribing antimotility and antiemetic agents or other medications that target the specific symptoms. In other situations, modifying the dose interval (i.e., administering a lower dose of drug more frequently throughout the day, as recommended by the manufacturer), may help promote adherence to the regimen.

Counseling and Education

Although HIV infection following an occupational exposure occurs infrequently, the emotional impact of the exposure often is substantial (102,103). In addition, HCWs are given seemingly conflicting information. Although HCWs are told that there is a low risk for HIV transmission, a 4-week regimen of PEP is recommended and they are asked to commit to behavioral measures (i.e., sexual abstinence or condom use) to prevent secondary transmission, all of which influence their lives for several weeks to months (102). Therefore, access to persons who are knowledgeable about occupational HIV transmission and who can deal with the many concerns an HIV exposure may raise for the HCW is an important element of postexposure management.

HIV-exposed HCWs should be advised to use the following measures to prevent secondary transmission during the follow-up period, especially during the first 6–12 weeks after the exposure when most HIV-infected persons are expected to seroconvert: use sexual abstinence or condoms to prevent sexual transmission and to avoid pregnancy; and refrain from donating blood, plasma, organs, tissue, or semen. If the exposed HCW is breastfeeding, she should be counseled about the risk for HIV transmission through breast milk, and discontinuation of breastfeeding should be considered, especially following high-risk exposures. If the HCW chooses to receive PEP, temporary discontinuation of breastfeeding while she is taking PEP should be considered to avoid exposing

the infant to these agents. NRTIs are known to pass into breast milk; it is not known whether this also is true for PIs.

There is no need to modify a HCW's patient-care responsibilities to prevent transmission to patients based solely on an HIV exposure. If HIV seroconversion is detected, the HCW should be evaluated according to published recommendations for HIV-infected HCWs (104).

Exposed HCWs should be advised to seek medical evaluation for any acute illness that occurs during the follow-up period. Such an illness, particularly if characterized by fever, rash, myalgia, fatigue, malaise, or lymphadenopathy, may be indicative of acute HIV infection but also may be due to a drug reaction or another medical condition.

Exposed HCWs who choose to take PEP should be advised of the importance of completing the prescribed regimen. Information should be provided about potential drug interactions and the drugs that should not be taken with PEP, the side effects of the drugs that have been prescribed (See Appendix), measures to minimize these effects, and the methods of clinical monitoring for toxicity during the follow-up period. They should be advised that the evaluation of certain symptoms should not be delayed (e.g., back or abdominal pain, pain on urination or blood in the urine, or symptoms of hyperglycemia [i.e., increased thirst and/or frequent urination]).

RECOMMENDATIONS FOR THE SELECTION OF DRUGS FOR PEP

The selection of a drug regimen for HIV PEP must strive to balance the risk for infection against the potential toxicity of the agent(s) used. Because PEP is potentially toxic, its use is not justified for exposures that pose a negligible risk for transmission (Figure 1). Also, there is insufficient evidence to recommend a highly active regimen for all HIV exposures. Therefore, two regimens for PEP are provided (Table 1): a "basic"

(continued on page 30)

STATE PUBLIC HEALTH LABORATORY REPORT

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Mar 98	Apr 98	Total YTD
Specimens Tested	8,791	7,818	32,768
Initial (percent)	78.0%	78.4%	25,264
Repeat (percent)	22.0%	21.6%	7,504
Specimens: Unsatisfactory	92	82	346
HT Borderline	662	700	2,932
HT Presumptive	21	17	71
PKU Borderline	1	1	3
PKU Presumptive Positive	1	1	4
GAL Borderline	5	0	10
GAL Presumptive Positive	4	2	7
FAS (Sickle cell trait)	66	77	316
FAC (Hb C trait)	27	23	99
FAE (Hb E trait)	3	1	7
FAX (Hb variant)	16	12	51
FS (Sickle cell disease)	4	4	17
FSC (Sickle C disease)	1	0	4
FC (Hb C disease)	0	1	1

	May 98	Jun 98	Total YTD
Specimens Tested	7,856	8,722	49,346
Initial (percent)	79.4%	78.3%	38,328
Repeat (percent)	20.6%	21.7%	11,018
Specimens: Unsatisfactory	105	73	524
HT Borderline	800	654	4,386
HT Presumptive	17	15	103
PKU Borderline	0	0	3
PKU Presumptive Positive	1	0	5
GAL Borderline	5	7	22
GAL Presumptive Positive	2	2	11
FAS (Sickle cell trait)	63	82	461
FAC (Hb C trait)	25	16	140
FAE (Hb E trait)	1	1	9
FAX (Hb variant)	12	12	75
FS (Sickle cell disease)	0	4	21
FSC (Sickle C disease)	2	3	9
FC (Hb C disease)	0	0	1

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

(continued from page 29)
two-drug regimen that should be appropriate for most HIV exposures and an "expanded" three-drug regimen that should be used for exposures that pose an increased risk for transmission (Figure 1) or where resistance to one or more antiretroviral agents is known or suspected. When possible, the regimens should be implemented in consultation with persons having expertise in antiretroviral treatment and HIV transmission.

Situations That Require Special Consideration

Resistance of the Source Virus to Antiretroviral Drugs

It is unknown whether drug resistance influences transmission risk; however, transmission of drug-resistant HIV has been reported (81,82) and is therefore a theoretical concern when choosing PEP regimens. If the source-person's virus is known or suspected to be resistant to one or more of the drugs included in the PEP regimen, the selection of drugs to which the source person's virus is unlikely to be resistant is recommended (69). If the resistance is to one class of antiretroviral drugs, the addition to the basic PEP regimen of a drug from another class might be considered (e.g., addition of a PI when a source patient has not been treated with a PI but has virus resistant to one or more NRTIs). It is strongly recommended that PEP be started regardless of the resistance status in the source virus; if resistance is known or suspected, a third or fourth drug may be added to the regimen until consultation with a clinical expert in the treatment of HIV infection or disease can be obtained.

Known or Suspected Pregnancy in the HCW

Pregnancy should not preclude the use of optimal PEP regimens, and PEP should not be denied to a HCW solely on the basis of pregnancy. However, as discussed previously, an occupationally exposed pregnant HCW must be provided with full information about what is known and not known regarding the potential benefits and risks associated with use of the antiretroviral drugs to her and her fetus for her to make an informed decision regarding the use of PEP. The choice of antiretroviral drugs to use for PEP in pregnant HCWs is complicated by the potential need to alter dosing because of physiologic changes associated with pregnancy and the potential for short- or long-term effects on the fetus and newborn. Thus, considerations that should be discussed with a pregnant HCW include the potential risk for HIV transmission based on the type of exposure; the stage of pregnancy (the first trimester being the period of maximal organogenesis and risk for teratogenesis); and what is known about the pharmacokinetics, safety, and tolerability of the drug or combination of drugs in pregnancy.

Table 2. HIV postexposure prophylaxis resources and registries

Resource or registry	Contact information
National Clinicians' Postexposure Hotline	Telephone: (888) 448-4911
HIV Postexposure Prophylaxis Registry	Telephone: (888) 737-4448 ([888] PEP4HIV) Write: 1410 Commonwealth Drive Suite 215 Wilmington, NC 28405
Antiretroviral Pregnancy Registry	Telephone: (800) 258-4263 Fax: (800) 800-1052 Write: 1410 Commonwealth Drive Suite 215 Wilmington, NC 28405
Food and Drug Administration (for reporting unusual or severe toxicity to antiretroviral agents	Telephone: (800) 332-1088
CDC (for reporting HIV seroconversions in health-care workers who received PEP)	Telephone: (404) 639-6425

POSTEXPOSURE REGISTRIES

Health-care providers in the United States are encouraged to enroll HCWs who receive PEP in a confidential registry developed by CDC, Glaxo Wellcome Inc., and Merck & Co., Inc., to assess toxicity; Ph: (888) 737-4448 ([888] PEP-4HIV), or write the HIV PEP Registry, 1410 Commonwealth Drive, Suite 215, Wilmington, NC 28405. Unusual or serious and unexpected toxicity from antiretroviral drugs should be reported to the manufacturer and/or FDA, Ph: (800) 332-1088.

Health-care providers also should report instances of prenatal exposure to antiretroviral agents to the Antiretroviral Pregnancy Registry. The registry is an epidemiologic project to collect observational, nonexperimental data on antiretroviral drug exposure during pregnancy to assess potential teratogenicity. Referrals should be directed to the Antiretroviral Pregnancy Registry, 1410 Commonwealth Drive, Suite 215, Wilmington, NC 28405; Ph: (800) 258-4263 or (800) 722-9292, Ext. 39437; FAX: (800) 800-1052.

A protocol has been developed to evaluate HIV seroconversion in an HCW who received PEP. These events can be reported to CDC, Ph: (404) 639-6425.

RESOURCES FOR CONSULTATION

Clinicians who seek consultation on HIV PEP for assistance in managing an occupational exposure should access local experts in HIV treatment as much as possible. In addition, the "National Clinicians' Post-Exposure Prophylaxis Hotline (PEP-Line)" has been created to assist clinicians with these issues; Ph: (888) 448-4911. Other resources and registries include the HIV Postexposure Prophylaxis Registry, the Antiretroviral Pregnancy Registry, FDA, and CDC (Table 2).

ADMINISTRATIVE CONSIDERATIONS

Effective implementation of the elements of postexposure management detailed in these recommendations may require various types of expertise. The assessment of the severity of an exposure generally requires clinical training and

experience (i.e., medical or nursing). However, the assessment of HIV infection risk and initiation of a basic PEP regimen necessitates knowledge or experience in clinical epidemiology, infection control, occupational health, or the clinical treatment of HIV. Decisions about HIV PEP are particularly complex if PIs are used or there is concern about drug-resistant virus. Thus, expert consultation when prescribing PEP is strongly encouraged. PEP protocols should list the names of readily available resources for consultation and could include policies that require infectious disease evaluation before prescribing an expanded antiretroviral regimen. However, these efforts should not delay initial implementation of PEP where it is appropriate.

References for these guidelines are available above request. Please contact the Office of Epidemiology, Missouri Department of Health, 920 Wildwood Drive, Jefferson City, MO 65109, Ph: (573) 751-6128. A full copy of the guidelines in pdf format can be found on CDC's Home Page at: **http://www.cdc.gov/epo/mmwr/mmwr_rr.html.**

Appendix

FIRST-LINE DRUGS FOR HIV POSTEXPOSURE PROPHYLAXIS (PEP)*

Nucleoside Reverse Transcriptase Inhibitors

Zidovudine (RETROVIR®; ZDV, AZT)

Dosage: 600 mg every day in divided doses (e.g., 300 mg twice a day, 200 mg three times a day, or 100 mg every four hours).
Primary toxicities and/or side effects: Neutropenia, anemia, nausea, fatigue, malaise, headache, insomnia, and asthenia.
Comments: Caution should be used if co-administered with bone marrow suppressive drugs or cytotoxic therapy.

Lamivudine (EPIVIR™; 3TC)

Dosage: 150 mg twice a day.
Primary toxicities and/or side effects: Headache, abdominal pain, diarrhea, and in rare cases, pancreatitis. Toxicity of ZDV and 3TC when used in combination is approximately equal to that of ZDV alone.

ZDV plus 3TC (COMBIVIR™)

Dosage: 1 tablet twice a day; each tablet contains 300 mg ZDV and 150 mg 3TC.
Primary toxicities and/or side effects: See above for ZDV and 3TC.
Comments: Caution should be used if co-administered with bone marrow suppressive drugs or cytotoxic therapy.

Protease Inhibitors (PIs)**

Indinavir (CRIXIVAN®; IDV)

Dosage: 800 mg every 8 hours on an empty stomach (i.e., without food or with a light meal).
Primary toxicities and/or side effects: Nephrolithiasis, crystalluria, hematuria, nausea, headache, indirect hyperbilirubinemia, elevated liver function tests (LFTs), and hyperglycemia/diabetes.
Primary drug interactions†: No PI should be co-administered with terfenadine (Seldane®), astemizole (Hismanal®), cisapride (Propulsid®), triazolam, and midazolam. Rifampin should not be administered with PIs. Cytochrome P450 metabolism inhibitors like ketoconazole may increase PI plasma concentrations; dose reduction of the PI is only indicated for indinavir. Ergot alkaloid preparations should not be used in combination with PIs. If rifabutin is used concomitantly, rifabutin dose should be reduced because of inhibition of rifabutin metabolism; with concomitant indinavir or nelfinavir use, reduce rifabutin dose by 50%.

Serum levels of PIs may be increased when multiple PIs are used in combination.
Comments: Incidence of nephrolithiasis may be reduced by consuming large quantities of water (i.e., drinking six 8 oz glasses of water [total 48 oz] throughout the day).

Nelfinavir (VIRACEPT™)

Dosage: 750 mg three times a day (with meals or a light snack).
Primary toxicities and/or side effects: Diarrhea and hyperglycemia/diabetes.
Primary drug interactions†: See above for indinavir.
Comments: Diarrhea usually can be controlled with over-the-counter antidiarrheal drugs (e.g., loperamide).

If oral contraceptives are being used, alternative or additional contraceptive measures should be used while taking nelfinavir.

---

*Information included in these recommendations may not represent Food and Drug Administration (FDA) approval or approved labeling for the particular products or indications in question. Specifically, the terms “safe” and “effective” may not be synonymous with the FDA-defined legal standards for product approval.

**It is recommended that consultation with experts in the treatment of HIV infection and disease be sought when considering the inclusion of PIs or the use of alternative agents in PEP regimens.

†See package insert for other contraindications and possible drug interactions.

ANTIRETROVIRAL DRUGS USED FOR TREATMENT OF HIV INFECTION THAT MAY BE CONSIDERED FOR PEP IN SPECIAL CIRCUMSTANCES

Nucleoside Reverse Transcriptase Inhibitors

Zalcitabine (HIVID®, ddC)

Dosage: 0.75 mg every 8 hours.
Primary toxicities and/or side effects: Stomatitis and peripheral neuropathy.
Primary drug interactions*: Do not co-administer ddC with didanosine or stavudine because of the potential for enhanced peripheral neuropathy.
Comments: Peripheral neuropathy from ddC is usually after prolonged exposure.

Didanosine (VIDEX®, ddI)

Dosage: 200 mg twice a day; if body weight is <60 kg, 125 mg twice a day. Should be taken on an empty stomach.
Primary toxicities and/or side effects: Pancreatitis, peripheral neuropathy, nausea, and diarrhea.
Primary drug interactions†: Do not co-administer ddI with ddC because of the potential for enhanced peripheral neuropathy.
Comments: Peripheral neuropathy from ddI is usually after prolonged exposure.
To avoid potential drug interactions, give concomitant medications 2 hours after ddI dosing.

Stavudine (ZERIT™, d4T)

Dosage: 40 mg twice a day; if body weight is <60 kg, 30 mg twice a day.
Primary toxicities and/or side effects: Peripheral neuropathy.
Primary drug interactions†: Do not co-administer d4T with ddC because of the potential for enhanced peripheral neuropathy.
Comments: Peripheral neuropathy from d4T is usually after prolonged exposure.

Protease Inhibitors (PIs)**

Ritonavir (NORVIR™)

Dosage: 600 mg twice a day; dose escalation recommended (300 mg twice a day for 1 day, 400 mg twice a day for 2 days, 500 mg twice a day for 1 day, then 600 mg twice a day for duration of regimen).
Primary toxicities and/or side effects: Nausea, emesis, diarrhea, circumoral paresthesia, taste alteration, increased cholesterol and triglycerides, hyperglycemia/diabetes, and increased LFTs.
Primary drug interactions†: No PI should be co-administered with terfenadine (Seldane®), astemizole (Hismanal®), cisapride (Propulsid®), triazolam, or midazolam. Rifampin should not be administered with PIs. Cytochrome P450 metabolism inhibitors such as ketoconazole may increase protease inhibitor plasma concentrations. Ergot alkaloid preparations should not be used in combination with PIs. Rifabutin should not be co-administered with either saquinavir (because of reduction of saquinavir serum concentrations) or ritonavir (because of increased rifabutin concentrations). Serum levels of PIs may be increased when multiple PIs are used in combination.
Comments: Ritonavir should not be used with various antiarrhythmics and certain sedatives or hypnotics. Ritonavir also has potential interactions with certain analgesics, antibiotics, antidepressants, anti-emetics, antifungals, calcium channel blockers, and other medications.
If oral contraceptives are being used, alternative or additional contraceptive measures should be used while taking ritonavir.

Saquinavir (INVIRASE™, hard-gel formulation) (FORTOVASE™, soft-gel formulation)

Dosage: INVIRASE, 600 mg three times a day with fatty meals; FORTOVASE, 1200 mg three times a day within 2 hours of a meal. (If saquinavir is used for PEP, Fortovase should be used.)
Primary toxicities and/or side effects: Diarrhea, headache, hyperglycemia/diabetes, and increased LFTs and triglycerides.
Primary drug interactions†: See above for ritonavir.

Non-nucleoside Reverse Transcriptase Inhibitors

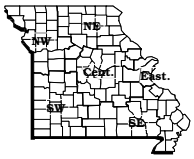
Nevirapine (VIRAMUNE®)

Dosage: 200 mg once a day for the first 2 weeks then 200 mg twice a day.
Primary toxicities and/or side effects: Rash (including rare cases of Stevens-Johnson syndrome), fever, nausea, headache, and increased LFTs.
Primary drug interactions†: Nevirapine induces hepatic cytochrome CYP3A isoforms; however, drug interaction studies with drugs metabolized by this enzyme have not been conducted. Careful monitoring is therefore recommended if nevirapine is co-administered with other drugs metabolized by this route because decreased serum concentrations (and decreased effectiveness) of the other drugs may be observed (e.g., oral contraceptives, rifampin, and rifabutin). Use of nevirapine may decrease levels of indinavir or saquinavir.
This drug should only be used in combination with other antiretroviral drugs.
Comments: Oral contraceptives may be less effective during concomitant use with nevirapine.

Delavirdine (RESCRIPTOR®)

Dosage: 400 mg three times a day
Primary toxicities and/or side effects: Rash (including rare cases of Stevens-Johnson syndrome), nausea, and increased LFTs.
Primary drug interactions†: Delavirdine inhibits hepatic cytochrome CYP3A isoforms. Should not be co-administered with terfenadine (Seldane®), astemizole (Hismanal®), cisapride (Propulsid®), triazolam, midazolam, nifedipine, anticonvulsants, amphetamines, rifabutin, or rifampin. Delavirdine may increase PI levels.
This drug should only be used in combination with other antiretroviral drugs.
Comments: Antacids and ddI decrease absorption of delavirdine and should be taken 2 hours apart.

** It is recommended that consultation with experts in the treatment of HIV infection and disease be sought when considering the inclusion of PIs or the use of alternative agents in PEP regimens.
† See package insert for other contraindications and possible drug interactions.



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention

QUARTERLY DISEASE REPORT

Reporting Period*
January - March 1998

	Districts											3 Month State Totals		Cumulative		
	CD	** ED	NE	** NW	SE	** SW	*** OTHER	Kansas City	St. Louis City	St. Louis Co.	Spfd. Greene Co.	1997	1998	For 1997	For 1998	5 YR MEDIAN
Vaccine Preventable																
Influenza	154	139	50	11	88	66	0	5	77	387	84	41	1061	227	1061	184
Mumps	0	0	0	0	0	1	0	0	0	0	0	0	1	0	3	7
Pertussis	0	2	0	1	0	1	0	0	1	4	0	13	9	25	17	10
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Viral Hepatitis																
A	6	3	1	89	16	16	0	2	3	7	35	287	178	537	178	256
B	1	3	0	15	7	6	0	5	21	5	2	77	65	191	65	134
C	0	0	0	4	1	1	0	9	1	0	1	1	17	2	17	N/A
Non-A Non-B	0	0	1	0	0	0	0	0	0	0	0	1	1	2	1	5
Unspecified	0	0	2	0	0	0	0	0	0	0	0	1	2	1	2	N/A
Meningitis																
Aseptic Meningitis	0	1	0	5	0	0	0	2	0	5	0	15	13	27	13	26
Meningococcal Disease	0	1	0	2	2	3	0	0	0	2	1	10	11	29	11	21
Meningococcal Other	1	3	2	2	0	1	0	2	5	3	0	17	19	37	19	12
Enteric Infections																
E. Coli O157:H7	0	0	0	0	1	1	0	1	0	0	0	13	3	15	3	2
Campylobacter	4	3	6	5	10	9	0	3	13	11	5	160	69	238	69	101
Salmonella	5	8	2	15	4	6	0	6	8	11	3	223	68	298	68	94
Shigella	0	0	0	10	1	3	0	1	4	1	0	53	20	122	20	144
Parasitic Infections																
Cryptosporidiosis	0	1	0	0	0	0	0	0	0	1	0	2	2	7	1	N/A
Giardiasis	17	12	4	16	10	21	0	5	22	26	2	165	135	282	135	135
Respiratory Diseases																
Legionellosis	1	0	0	0	0	2	0	0	1	2	1	0	7	2	7	4
Sexually Transmitted																
AIDS	5	2	1	9	5	3	3	32	31	19	5	92	115	92	115	169
HIV	0	0	0	0	0	0	0	0	0	0	-	-	0	-	0	-
Chlamydia	261	80	66	224	187	236	0	579	702	533	-	-	2868	-	2868	-
Gonorrhea	146	30	17	43	79	81	0	290	683	306	-	-	1675	-	1675	-
Prim. & Sec. syphilis	0	0	0	0	12	0	0	2	17	3	-	-	34	-	34	-
Tuberculosis																
Positive PPD conversions	2	1	1	2	4	4	0	4	10	8	2	37	38	100	38	-
Zoonotic																
Ehrlichiosis	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	N/A
Lyme-like Disease	0	0	0	0	0	0	0	0	0	0	0	9	0	9	0	5
Rabies (Animal)	0	0	0	0	8	0	0	0	0	0	0	5	8	11	8	12
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	0	0	0	0	7	0	8	0	N/A
Tularemia	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	1

Outbreaks
Foodborne
Waterborne
Nosocomial
Pediculosis
Scabies
Giardia
Hepatitis A
Shigella
Other

Low Frequency Vaccine Preventable Diseases
Diphtheria
Hib Meningitis - 1
Hib other invasive - 2
Measles
Polio
Rubella
Tetanus

Low Frequency Diseases
Anthrax
Botulism
Brucellosis - 1
Chancroid
Cholera
Encephalitis
Granuloma Inguinale
Kawasaki Disease - 4
Leptospirosis
Listeria - 2
Lymphogranuloma Venereum
Plague
Psittacosis
Rabies (human)
Reye syndrome
Rheumatic fever, acute
Streptococcal Disease, Invasive, Grp A - 4
Streptococcus pneumoniae, Drug Resistant Invasive Disease
Toxic Shock Syndrome - 1
Trichinosis
Typhoid Fever

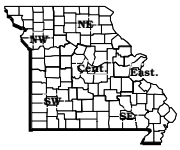
*Reporting Period Beginning January 4 and Ending March 28, 1998.
**Totals do not include Kansas City, St. Louis City, St. Louis County, or Springfield
***State and Federal Institutions
****Included in SW District
- Data unavailable

Due to data editing, totals may change

TEAR OUT FOR FUTURE REFERENCE

Missouri Morbidity and Mortality Reports of Selected Communicable Diseases - 15 Year Report

	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983
AIDS	501	845	769	727	1644	657	651	596	478	401	240	91	52	28	6
Brucellosis	2	2	0	0	0	0	3	1	2	4	14	4	12	7	4
Campylobacter	574	554	601	631	616	614	602	547	473	441	260	281	304	260	166
Chickenpox	6319	5830	8840	10147	9609	10009	7678	10591	9086	11350	8595	5093	2474	2565	408
Chlamydia	12257	11952	12084	12244	11625	11907	10643	11151	8151	6239	2944	1532	412	9	-
Encephalitis, Inf.	9	5	11	14	26	16	22	12	6	8	11	13	12	11	28
Giardiasis	800	777	761	774	770	739	790	878	859	654	690	516	458	462	216
Gonorrhea	7658	8415	11302	12555	13147	14887	17450	20012	21053	17241	16491	19029	20023	20042	20750
Haemophilus influenzae type B															
Meningitis	1	0	10	7	12	22	42	88	106	138	131	172	108	104	86
Other Invasive	7	8	18	44	123	59	39	57	-	-	-	-	-	-	-
Hepatitis A	1151	1414	1338	619	1443	1500	653	619	810	897	560	126	98	138	123
Hepatitis B	360	326	437	538	585	535	549	633	704	639	460	420	359	297	365
Non A, Non B	4	23	23	32	25	27	31	42	53	50	46	39	42	18	33
Unspecified	1	0	1	1	19	9	15	19	13	21	21	15	24	46	87
Influenza (confirmed)	270	283	491	163	272	111	462	220	293	148	69	78	61	39	140
Lyme Disease	28	52	53	102	108	150	207	205	108	-	-	-	-	-	-
Malaria	16	11	9	14	9	12	9	13	13	6	8	12	5	8	4
Meningitis, Aseptic	99	120	269	175	275	272	277	246	223	124	163	172	156	95	277
Meningitis, Meningococcal	43	57	54	43	34	32	37	31	21	33	35	40	46	53	55
Mumps	0	10	25	44	46	39	40	62	87	68	38	23	18	11	21
Pertussis	80	74	63	45	144	120	83	116	141	25	46	32	35	23	24
Polio, all forms	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2
Rabies, Animal	31	26	30	27	35	37	28	30	62	36	59	75	59	70	96
RMSF	24	19	30	22	20	24	25	36	48	54	26	25	10	14	14
Rubella	2	0	0	2	1	1	5	3	4	0	0	1	7	0	0
Rubeola	1	3	2	161	1	0	1	103	671	65	190	32	5	6	1
Salmonellosis	568	565	577	642	529	426	616	723	676	772	660	728	690	617	602
Shigellosis	222	387	1138	654	674	742	259	284	411	607	471	89	143	244	264
Syphilis, Total	505	603	1271	1985	2499	1940	926	598	388	473	328	494	578	712	801
Primary & Secondary	118	221	584	987	1354	1167	572	272	162	154	90	110	133	186	145
Tetanus	0	1	3	1	1	1	1	0	4	1	1	2	3	6	1
Tuberculosis	248	224	244	260	256	245	254	312	278	275	339	338	311	354	399
Tularemia	18	9	25	24	17	34	44	33	39	45	58	32	35	40	51
Typhoid Fever	1	2	3	1	2	3	2	4	2	3	7	6	6	6	10
Yersinia enterocolitica	30	16	21	40	26	37	48	32	36	30	10	6	2	3	1



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention

QUARTERLY DISEASE REPORT

Reporting Period*
April - June 1998

	Districts											3 Month State Totals		Cumulative		
	CD	** ED	NE	** NW	SE	** SW	*** OTHER	Kansas City	St. Louis City	St. Louis Co.	Spfd. Greene Co.	1997	1998	For 1997	For 1998	5 YR MEDIAN
Vaccine Preventable																
Influenza	3	0	0	4	2	0	0	1	0	3	0	41	13	227	1074	201
Mumps	0	0	0	0	0	1	0	0	0	0	0	-	1	0	1	18
Pertussis	0	2	0	1	0	0	0	0	0	0	0	12	3	25	12	24
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Viral Hepatitis																
A	5	1	1	52	15	36	0	9	2	3	45	287	169	537	347	584
B	1	2	1	10	1	9	0	6	26	4	2	77	62	191	127	242
C	0	0	0	5	0	3	0	12	0	0	1	1	21	2	38	N/A
Non-A Non-B	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	13
Unspecified	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	N/A
Meningitis																
Aseptic Meningitis	0	15	1	3	0	0	0	0	1	19	0	15	39	27	52	63
Meningococcal Disease	0	1	1	0	0	2	0	0	0	2	2	10	8	29	19	28
Meningococcal Other	0	1	1	2	2	3	0	0	0	2	1	17	12	37	31	22
Enteric Infections																
E. Coli O157:H7	0	0	0	1	1	3	0	2	0	0	0	13	7	15	10	16
Campylobacter	13	11	10	8	18	24	0	10	3	23	20	160	140	238	209	295
Salmonella	37	15	4	27	12	13	0	10	14	30	4	223	166	298	234	250
Shigella	3	0	0	1	3	6	0	0	5	7	4	53	29	122	49	222
Parasitic Infections																
Cryptosporidiosis	0	0	1	0	0	1	0	0	2	1	1	2	6	7	8	N/A
Giardiasis	19	8	6	10	11	19	0	7	34	24	4	165	142	282	277	287
Respiratory Diseases																
Legionellosis	0	0	1	0	0	2	0	0	0	1	0	0	4	2	11	13
Sexually Transmitted																
AIDS	15	3	4	21	4	7	3	31	360	21	3	109	148	201	378	177
HIV	0	0	0	0	0	0	0	0	0	0	-	-	0	-	0	-
Chlamydia	293	73	77	254	217	239	0	547	658	483	-	2938	2843	5697	5709	-
Gonorrhea	114	21	29	92	115	52	0	676	939	421	-	2116	2459	3658	4134	-
Prim. & Sec. syphilis	0	0	0	0	2	0	0	3	13	2	-	29	23	51	54	-
Tuberculosis																
Positive PPD conversions	2	1	1	2	4	4	0	4	10	8	2	37	38	100	38	-
Zoonotic																
Ehrlichiosis	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	N/A
Lyme-like Disease	0	0	1	0	0	1	0	0	0	0	0	9	2	9	2	33
Rabies (Animal)	0	0	0	0	11	0	0	-	0	0	-	5	11	11	19	12
Rocky Mountain Spotted Fever	0	0	0	0	0	3	0	-	-	-	-	7	3	8	3	11
Tularemia	2	0	1	1	0	0	0	-	-	-	-	4	4	4	4	9

Outbreaks
Foodborne
Waterborne
Nosocomial
Pediculosis
Scabies
Giardia
Hepatitis A
Shigella
Other

Low Frequency Vaccine Preventable Diseases
Diphtheria
Hib Meningitis
Hib other invasive - 7
Measles
Polio
Rubella
Tetanus

Low Frequency Diseases
Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Encephalitis - 2
Granuloma Inguinale
Kawasaki Disease - 5
Leptospirosis - 1
Listeria - 7
Lymphogranuloma Venereum
Plague
Psittacosis
Rabies (human)
Reye syndrome
Rheumatic fever, acute
Streptococcal Disease, Invasive, Grp A - 5
Streptococcus pneumoniae, Drug Resistant Invasive Disease
Toxic Shock Syndrome - 4
Trichinosis
Typhoid Fever - 1

*Reporting Period Beginning March 29 and Ending June 27, 1998.
**Totals do not include Kansas City, St. Louis City, St. Louis County, or Springfield
***State and Federal Institutions
**** Included in SW District
- Data unavailable

Due to data editing, totals may change

TEAR OUT FOR FUTURE REFERENCE

Select Communicable Diseases
Total Number of Cases Per Year
1998 Year to Date as of September 28, 1998

DISEASE	1998-YTD	1997	1996	1995	1994	1993
Influenza	1075	270	283	491	163	272
Mumps	0	0	10	25	44	46
Pertussis	0	80	74	63	0	0
Hepatitis A	487	1151	1414	1338	619	1443
Hepatitis B	167	360	326	437	538	585
Hepatitis C	77	6	-	-	-	-
Hepatitis Non-A Non-B	1	4	23	23	32	25
Hepatitis Unspecified	2	1	0	1	1	19
Meningitis	27	43	57	54	43	34
Meningitis Other	35	63	41	22	35	0
E. coli O157:H7	33	58	74	48	40	35
Campylobacter	363	574	554	601	631	616
Salmonella	447	568	424	577	642	529
Shigella	81	222	387	1138	654	674
Cryptosporidiosis	16	38	35	31	-	-
Giardia	502	800	777	761	774	770
Legionellosis	20	26	18	19	41	33
Ehrlichiosis	11	20	12	0	0	0
Lyme	2	28	52	53	102	108
Rabies	23	31	26	30	27	35
Rocky Mountain Spotted Fever	4	24	19	30	22	20

Cases of reportable diseases and conditions should be reported promptly to your local health department, or to the Missouri Department of Health at

(800) 392-0272
(during working hours)
or
(573) 751-4674
(after hours, weekends or holidays)

The U.S. Influenza Sentinel Physician Surveillance Network

Mary E. Kliethermes, R.N., B.S.
Bureau of Communicable Disease Control

During the 1997–98 influenza season, the Centers for Disease Control and Prevention (CDC) introduced a pilot influenza project called the U.S. Influenza Sentinel Physician Surveillance Network. The program was designed as an active surveillance system to provide timely reporting of current influenza-like illness. The annual influenza season begins on week 40 and continues through week 20 of the next year. For 1998–99, that will be October 4, 1998 through May 16, 1999.

CDC defines **influenza-like illness** as fever ≥100º Fahrenheit (37.8º C) and cough or sore throat, in the absence of a known cause.

State health departments were asked to recruit physicians who would volunteer to be sentinel physicians and collect the numbers of patients, stratified by age group, that they treated each week with symptoms of influenza-like illness as well as the total number of patients they saw each week. The physicians, calling a dedicated phone number using an assigned ID code and entering the data by touch-tone phone, reported the prior week's data to CDC before noon each Tuesday during the influenza season. Physicians were given the option of faxing the data into CDC to facilitate reporting. The physicians were also asked to collect viral cultures, at least two cultures from symptomatic patients at the beginning of the influenza season, two in the middle or at the peak of the season, and two during the decline of the season.

The Missouri Department of Health (DOH), Bureau of Communicable Disease Control, attempted to recruit 20 physicians to reflect a ratio of one physician for every 250,000 persons in the state. DOH was able to recruit 12 physicians and 75 percent of those physicians actively participated in the surveillance network with timely, weekly submission of data.

The Missouri State Public Health Laboratory (SPHL) shipped each participating physician a supply of virus culture kits with instructions on proper collection, storage and shipping methods. The SPHL replaced the culture kits as the physicians submitted specimens for testing. The SPHL Virology Unit processed 322 influenza cultures in 1997. The influenza sentinel physicians contributed approximately 57 of those specimens. Of the 322 cultures, 106 (33%) specimens were positive for influenza.

CDC collected the data submitted by all participating state health departments and published the influenza-like illness numbers and trends in the weekly influenza summary published each week during the influenza season and sent to state health departments. Missouri data were also available through the CDC influenza internet site, using a protected password.

CDC was very pleased with the success of the U.S. Influenza Sentinel Physician Surveillance Network pilot project and will be expanding the program for the 1998/99 influenza season. According to CDC, an influenza sentinel physician surveillance program can contribute the following:

1. Provides “real time” data and information on the spread and severity of influenza illness during the season.
2. Collection of viral cultures from ill patients to identify the circulating influenza virus strains.
3. Provides information on new circulating influenza viral strains that can be used to determine the components of the vaccine for the next influenza season and as a pandemic warning.

CDC felt that the prior influenza surveillance system was not as sensitive to a pandemic warning as it could be when compared to surveillance networks in other countries. The H5N1 influenza outbreak in Hong Kong, reinforced the need to improve the surveillance program.

DOH is developing plans for the 1998/99 influenza season to expand the influenza sentinel physician surveillance network and to improve the link between the epidemiological data and viral culture results. DOH hopes to recruit many more physicians who would be interested in participating in the influenza network to expand this valuable public health program.

If you are a Missouri physician, or nurse practitioner working in collaboration with a physician, and are interested in participating in or would like more information about the U.S. Influenza Sentinel Physician Surveillance Network, please contact the Bureau of Communicable Disease Control at (573) 751-6113 or (800) 372-0272.

Disease Reporting

Cases of reportable diseases and conditions should be reported promptly to your local health department, or to the Missouri Department of Health at

(800) 392-0272
(during working hours)
or
(573) 751-4674
(after hours, weekends or holidays)

1998–99 Recommendations for the Use of Influenza Vaccine

The following is a summary of current recommendations on influenza vaccine from the Advisory Committee on Immunization Practices (ACIP). The complete ACIP statement was published in *Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports*, Prevention and Control of Influenza, May 1, 1998, Vol. 47, No. RR-6.*

Influenza vaccine is strongly recommended for any person 6 months of age or older who is at increased risk for complications of influenza. Members of high risk groups, if they become ill, are more likely than the general population to require hospitalization. The following persons are at highest risk. They and their close contacts should be targeted for organized vaccination programs.

- Persons 65 years of age and older.
- Residents of nursing homes and other chronic-care facilities that house persons of any age with chronic medical conditions.
- Adults and children with chronic disorders of the pulmonary and cardiovascular systems, including asthma.
- Adults and children who required regular medical follow-up or hospitalization during the preceding year because of chronic metabolic diseases (including diabetes mellitus), renal dysfunction, hemoglobinopathies or immunosuppression (including immunosuppression caused by medications).
- Children and teenagers 6 months to 18 years of age who are receiving long-term aspirin therapy and, therefore, might be at risk for developing Reye syndrome after influenza.
- Women who will be in the second/third trimester of pregnancy during the influenza season.

Groups that can transmit influenza to persons at high risk should also be immunized. These groups include:

- Physicians, nurses and other personnel in both hospital and outpatient-care settings;
- Employees of nursing homes and chronic-care facilities who have contact with residents;
- Providers of home care to persons at high risk; and
- Household members (including children) of persons in high-risk groups.

Any person who wishes to reduce the likelihood of becoming ill with influenza should receive the vaccine.

The optimal time for organized vaccination campaigns for persons in high-risk groups is usually the period from October through mid-November. In the United States, influenza activity generally peaks between late December and early March. Administering vaccine too far in advance of the influenza season should be avoided, especially for nursing home residents, because antibody levels may begin to decline within a few months of vaccination.

Influenza vaccine should not be administered to persons known to have anaphylactic hypersensitivity to eggs or to other components of the influenza vaccine. Flu vaccine contains only noninfectious viruses, and cannot cause influenza. Respiratory disease after vaccination represents coincidental illness unrelated to influenza vaccination. The most frequent side effect of vaccination, reported by fewer than one third of vaccinees, is soreness at the injection site. Unlike the 1976 swine influenza vaccine, subsequent vaccines prepared from other virus strains have not been clearly associated with an increased frequency of Guillain-Barré syndrome.

The trivalent influenza vaccine prepared for the 1998–99 season will include A/Beijing/262/95-like (H1N1), A/Sydney/5/97-like (H3N2), and B/Beijing/184/93-like hemagglutinin antigens. For the B/Beijing/184/93-like antigen, United States manufacturers will use the antigenically equivalent strain B/Harbin/07/94 because of its growth properties.

A summary of the 1997–98 influenza season in Missouri can be found on pages 1–2 of this issue.

Surveys indicate that less than one-half of the high-risk populations receive influenza vaccine each year.** More effective strategies are needed for delivering vaccine to persons at high risk and to their health-care providers and household contacts. Successful vaccination programs have combined education for health-care workers, publicity and education targeted toward potential recipients, a plan for identifying persons at high risk (usually by medical-record review) and efforts to remove administrative and financial barriers that prevent persons from receiving the vaccine.

---

* The Morbidity and Mortality Weekly Report (MMWR) is available free of charge in electronic format and on a paid subscription basis for paper copy ($118 per year). To receive an electronic copy on Friday of each week, send an e-mail message to listserv@listserv.cdc.gov. The body content should read SUBscribe mmwr-toc. Electronic copy also is available from CDC's World-Wide Web server at http://www.cdc.gov/epo/mmwr/mmwr.html or from CDC's file transfer protocol server at ftp.cdc.gov/pub/Publications/mmwr. To subscribe for paper copy, contact Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, Ph: (202) 512-1800.

** In 1996, Medicare provided reimbursement for this vaccine for less than 45.3 percent of its beneficiaries in Missouri. Local health agencies and nursing homes who are not currently Medicare providers may apply, through a simplified application process, for a special provider number which will allow them to receive reimbursement for influenza vaccine given to Medicare beneficiaries. Any questions about this process should be directed to the Section of Vaccine Preventable and Tuberculosis Disease Elimination at (573) 751-6133.

Outpatient Clinics and Physicians' Offices

Staff in physicians' offices, clinics, health-maintenance organizations and employee health clinics should be instructed to identify and label the medical records of patients who should receive vaccine. Vaccine should be offered during visits beginning in September and throughout the influenza season. The offer of vaccine and its receipt or refusal should be documented in the medical record. Patients in high-risk groups who do not have regularly scheduled visits during the fall should be reminded by mail or telephone of the need for vaccine.

Facilities Providing Episodic or Acute Care

Health-care providers in these settings (e.g., emergency rooms and walk-in clinics) should be familiar with influenza vaccine recommendations. They should offer vaccine to persons in high-risk groups or should provide written information on why, where and how to obtain the vaccine.

Nursing Homes and Other Residential Long-Term-Care Facilities

Vaccination should be routinely provided to all residents of chronic-care facilities with the concurrence of attending physicians rather than by obtaining individual vaccination orders on each patient. Consent for vaccination should be obtained from the resident or a family member at the time of admission to the facility, and all residents should be vaccinated at one time, immediately preceding the influenza season. Residents admitted during the winter months after completion of the vaccination program should be vaccinated when they are admitted.

Acute-Care Hospitals

All persons 65 years of age or older, and younger persons (including children) with high-risk conditions who are hospitalized at any time from September through March, should be offered and strongly encouraged to receive influenza vaccine before they are discharged. Household members and others with whom they will have contact should receive written information about why and where to obtain influenza vaccine.

Visiting Nurses and Others Providing Home Care to Persons at High Risk

Nursing care plans should identify patients in high risk groups, and vaccine should be provided in the home if necessary. Caregivers and other persons in the household (including children) should be referred for vaccination.

Health Care Workers

Administrators of all health-care facilities should arrange for influenza vaccine to be offered to all personnel before the influenza season. Personnel should be provided with appropriate educational materials and strongly encouraged to receive vaccine. Particular emphasis should be placed on vaccination of persons who care for members of high-risk groups (e.g., staff of intensive care units [including newborn intensive care units], staff of medical/surgical units and employees of nursing home and chronic care facilities). Using a mobile cart to take vaccine to hospital wards or other work sites and making vaccine available during night and weekend work shifts can enhance compliance, as can a follow-up campaign early in the course of a community outbreak.

Persons Traveling to Foreign Countries

Persons preparing to travel to the tropics at any time of year or to the Southern Hemisphere from April through September should review their influenza vaccination histories. If they were not vaccinated the previous fall or winter, they should consider influenza vaccination before travel. Persons in high-risk groups should be especially encouraged to receive the most current vaccine. Persons at high risk who received the previous season's vaccine before travel should be revaccinated in the fall or winter with the current vaccine.

LATE BREAKERS

- Dr. Marion Warwick has accepted a dual role as medical consultant for the Division of Environmental Health and Communicable Disease Prevention, as well as the Bureau Chief of the Bureau of Communicable Disease Control. The former bureau chief, Caryl Collier, has accepted the position of Chief of the Office of Communicable Disease Consultation, QA and Training for the division. In this capacity, Caryl will provide technical assistance and consultation for all division disease outbreak responses. Caryl will also coordinate post-event input and analysis by staff and our partners to enable us to continually improve our response capabilities.

- The Department of Health has seen an increase in enteroviral meningitis for July–August 1998 compared to the same time period in 1997. Due to a large cluster in the St. Louis metropolitan area, serotyping was done and 60% of the specimens submitted from that area were serotyped as echovirus 30. While aseptic meningitis itself is generally self-limited and usually benign, it normally requires the hospitalization of the patient in order to rule out other causes of meningitis.

- The DOH Home Page has recently gone through some changes. Electronic versions of the *Missouri Epidemiologist* can now be found at **http://www.health.state.mo.us/MoEpi/MoEpi.html**.

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
P.O. Box 570
Jefferson City, MO 65102-0570
www.health.state.mo.us

The *Missouri Epidemiologist* is a regularly scheduled bimonthly newsletter published jointly by the Office of Epidemiology, Center for Health Information Management and Epidemiology (CHIME) and the Division of Environmental Health and Communicable Disease Prevention (EHCDP). CHIME's responsibilities include managing health statistical systems, epidemiological functions and information systems of the department. EHCDP's responsibilities include the prevention and control of communicable diseases and environmentally induced illnesses, including the requisite epidemiological investigations.

The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272.

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Office of Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

VIDEOCONFERENCES

The Section of Vaccine Preventable and Tuberculosis Disease Elimination will sponsor the following Centers for Disease Control and Prevention (CDC) satellite broadcasts:

Preparing for the Next Influenza Pandemic

~~November 20, 1998~~ Tentatively Rescheduled for February 25, 1999

This program will identify the main points in the guidelines for influenza pandemic preparedness and discuss a successful local and state preparedness program. In addition, the participants will have the opportunity to form partnerships and to start a plan of action to prepare emergency response plans for handling an influenza pandemic.

Surveillance of Vaccine-Preventable Diseases

December 3, 1998
11:00 a.m.–2:30 p.m.

This program will provide guidelines for vaccine-preventable disease surveillance, case investigation and outbreak control. Updates for the 1997 Surveillance Manual will be provided for the video conference.

The broadcasts feature question-and-answer sessions in which participants can address questions to the course instructors on toll-free telephone lines. Continuing education credits will be offered for a variety of professions.

For more information about the courses, please contact the immunization representative located in your district health office or the Section of Vaccine Preventable and Tuberculosis Disease Elimination at (800) 699-2313.

Missouri EPIDEMIOLOGIST

Volume 20, Number 5 *September-October 1998*

Perinatal HIV Prevention: A Statewide Survey of Missouri Health Professionals About Critical Issues on Perinatal HIV Transmission

Evelyn L. Wilson, B.S.N., M.P.A.
Office of Surveillance

Robert H. Hamm, M.D., M.P.H.
Office of Epidemiology

Kurt M. Kleier
Office of Surveillance

Introduction

Results of the Pediatric AIDS Clinical Trials Group (PACTG) Protocol 076 study demonstrated that administration of zidovudine (ZDV, AZT) to HIV-infected pregnant women and their newborns can significantly reduce the risk of perinatal HIV transmission.[1] Subsequent epidemiologic data have confirmed the efficacy of ZDV for reduction of perinatal transmission and have extended this efficacy to children of women with advanced disease, low CD4+ T-lymphocyte counts, and prior ZDV therapy.[2] These are significant findings which make it increasingly important for all prenatal providers to identify pregnant women who are infected with HIV and offer them the opportunity for appropriate treatment to reduce the chances they will transmit the virus to their offspring. In 1995, the Missouri Department of Health, together with health professionals from outside the department, developed a policy to reduce the risk of perinatal HIV transmission in Missouri. In early 1998 a questionnaire was developed and sent to selected medical providers in the state to assess their current beliefs and practices relative to prevention of perinatally transmitted HIV infection. This report will analyze the responses to this questionnaire from three specific groups of professionals providing care to pregnant women: obstetrician/gynecologists (OB/GYNs), general/family practice physicians (GP/FPs) and advanced practice nurses (APNs)†.

Methods

A list of 1997 Missouri-licensed OB/GYNs (n=606), GP/FPs *who reported delivering infants* (n=130) and APNs *who reported obstetrics/gynecology as an area of interest* (n=227) was obtained from the State Center for Health Statistics. The Missouri Perinatal Association collaborated with the Missouri Department of Health to conduct the study using the "total design method."[3] A questionnaire was sent in January 1998 to each of these 963 professionals. Unique identifiers linked to specific provider data allowed for aggressive follow-up of unreturned surveys in order to reach the target response rate of 75 percent.

Results

Questionnaires were sent to 963 professionals. Early in the study, 63 individuals were dropped from further follow-up for the reasons listed in Table 1 on page 2, reducing the study pool to 900. Of this group, 672 returned their questionnaires for an overall return rate of 74.6 percent. Questionnaires were returned by 389 (70.0%) of 556 OB/GYNs, 92 (72.4%) of 127 GP/FPs, and 191 (88.0%) of 217 APNs. Each individual was asked on the questionnaire whether he or she had personally provided care or services to pregnant women since the beginning of 1997; only the 545 respondents who indicated that they had provided such care or services in Missouri (338 OB/

(continued on page 2)

Inside this Issue...

†Advanced practice nurses are in middle management, have a teaching or consultant role and/or are nurse practitioners or certified nurse midwives.

Table 1. Prenatal Provider Survey Potential Subjects Dropped From Study by Reason and Type of Provider, Missouri, 1998.

Reason Dropped From Study	OB/GYN Physicians		GP/FP Physicians		Advanced Practice Nurses	
	Number	Percent	Number	Percent	Number	Percent
Moved Out of State	19	38.0%	2	66.6%	1	10.0%
No Missouri License	11	22.0%	1	33.3%	0	0.0%
Letter Undeliverable	5	10.0%	0	0.0%	1	10.0%
Unclaimed Certified Mail	4	8.0%	0	0.0%	2	20.0%
Retired	5	10.0%	0	0.0%	0	0.0%
Practice Out of Missouri	0	0.0%	0	0.0%	4	40.0%
Refused to Participate	2	4.0%	0	0.0%	1	10.0%
Stopped Prenatal Care	2	4.0%	0	0.0%	0	0.0%
On Medical Leave	1	2.0%	0	0.0%	0	0.0%
Unemployed	0	0.0%	0	0.0%	1	10.0%
Deceased	1	2.0%	0	0.0%	0	0.0%
TOTAL	**50**	**100.0%**	**3**	**100.0%**	**10**	**100.0%**

Table 2. Prenatal Provider Survey Participants by Geographic Area of Practice and Type of Provider, Missouri, 1998.

Geographic Area of Practice	OB/GYN Physicians		GP/FP Physicians		Advanced Practice Nurses	
	Number	Percent	Number	Percent	Number	Percent
St. Louis Area*	143	42.3%	1	1.2%	22	17.9%
Kansas City Area**	66	19.5%	9	10.7%	23	18.7%
Outstate Missouri	129	38.2%	74	88.1%	78	63.4%
TOTAL	**338**	**100.0%**	**84**	**100.0%**	**123**	**100.0%**

*St. Louis City, St. Louis County and St. Charles County
**Cass, Clay, Jackson, Lafayette, Platte and Ray counties

(continued from page 1)
GYNs, 84 GP/FPs, and 123 APNs) are included in the analysis which follows. Table 2 indicates the geographic areas where these 545 respondents practice.

Table 3 summarizes the experience of these 545 providers with regard to caring for HIV-infected pregnant women. Overall, 86 (15.8%) respondents indicated that they had knowingly cared for one or more such infected women since January 1997.

Table 3. Proportion of Survey Participants Who Have Knowingly Provided Care* to HIV-Infected Pregnant Women by Type of Provider, Missouri, 1998.

Type of Provider	Proportion Who Have Knowingly Provided Care* to HIV-Infected Pregnant Women	
Obstetrician/Gynecologist	60/338	(17.8%)
General/Family Practitioner	5/84	(6.0%)
Advanced Practice Nurse	21/123	(17.1%)

*Since January 1997

Table 4 summarizes the responses of the three provider groups to statements related to prevention of perinatal HIV transmission. High percentages of respondents (>80%) in each of the provider groups agreed or strongly agreed that childbearing-age women should be evaluated for their HIV risk, and that they should receive HIV education/counseling as a routine part of their care. However, among physician respondents, a much smaller proportion (57.4% of the OB/GYNs and 51.2% of the GP/FPs) felt that such education/counseling should be a requirement for providers. Over 90 percent of respondents in each of the provider groups agreed or strongly agreed that all pregnant women should be offered HIV testing as part of their prenatal care, but a much lower percentage (49.7% of OB/GYNs, 50.0% of GP/FPs and 46.3% of APNs) believed that such testing should be mandatory. High percentages (>90%) of the physician respondents and the APNs agreed or strongly agreed that ZDV can significantly reduce the risk of perinatal HIV transmission. However, lower percentages of providers (67.5% of OB/GYNs, 64.3% of GP/FPs and 47.2% of APNs) felt antiretroviral treatment of HIV-infected pregnant women should be mandatory.

Table 4. Percentage of Survey Participants Who Agree or Strongly Agree with Selected Statements on HIV Prevention by Type of Provider, Missouri, 1998.

Statement	OB/GYN Physicians (n = 338)	GP/FP Physicians (n = 84)	Advanced Practice Nurses (n = 123)
All women of childbearing age should be evaluated for their risk of HIV infection.	88.5%	83.8%	82.9%
All pregnant women should receive HIV education and counseling as a routine part of their prenatal care.	89.3%	89.4%	95.1%
Providers of prenatal care should be required to provide HIV education/counseling to all of their pregnant patients.	57.4%	51.2%	76.4%
All pregnant women should be offered HIV testing by their prenatal provider.	92.9%	98.8%	98.4%
HIV testing of all pregnant women should be mandatory.	49.7%	50.0%	46.3%
Zidovudine (ZDV, AZT) can significantly reduce the risk of maternal-infant transmission of HIV.	95.6%	90.5%	90.2%
Zidovudine (ZDV, AZT) treatment of HIV-positive pregnant women should be mandatory.	67.5%	64.3%	47.2%

Table 5. Percentage of Survey Participants Who Routinely Evaluate Their Childbearing-Age Female Patients for Selected HIV-Associated Risk Behaviors by Type of Provider, Missouri, 1998.

Risk Behavior*	OB/GYN Physicians (n = 338)	GP/FP Physicians (n = 84)	Advanced Practice Nurses (n = 123)
Sexually Transmitted Disease History	96.2%	92.9%	98.4%
Multiple Sexual Partners	74.0%	72.6%	85.4%
Exchange Money/Drugs for Sex	25.1%	19.0%	38.2%
Sexual Contact with HIV-Positive Person	48.2%	54.8%	57.7%
Sexual Contact with Bisexual Male	23.7%	23.8%	45.5%
Sexual Contact with Injecting Drug User	39.1%	50.0%	51.6%
Sexual Assault or Rape	49.7%	46.4%	71.5%
Drug Use History	91.7%	86.9%	92.7%
Residence in Areas With High HIV Rates	15.4%	15.5%	12.5%
None of the Above	1.5%	3.6%	0.0%

*Respondents were instructed to indicate all risk behaviors that are routinely evaluated.

Providers were asked if they had heard of the PACTG Protocol 076 study and its findings.[1] High proportions responded affirmatively (89.1% of OB/GYNs, 79.8% of GP/FPs and 77.2% of APNs). Among those providers who reported having cared for HIV-infected pregnant women, these percentages were even higher (100% of OB/GYNs, 100% of GP/FPs and 95.0% of APNs).

The providers were then asked if they were aware of the published clinical guidelines from the United States Public Health Service (USPHS) on the use of antiretroviral medications to reduce the risk of perinatal HIV transmission.[4] A relatively high percentage of OB/GYNs (74.6%), but lesser percentages of other providers (63.1% of GP/FPs and 61% of APNs) indicated awareness. Among those who reported having cared for HIV-infected pregnant women, the percentage with knowledge of the guidelines was higher for the OB/GYN and APN provider groups (91.5% of OB/GYNs, 60% of GP/FPs and 80.9% of APNs). All respondents who indicated they had knowledge of the guidelines were next asked to respond to the

(continued on page 4)

(continued from page 3)
statement that these guidelines represent reasonable recommendations which should generally be followed by prenatal providers. Agreement or strong agreement with this statement was lower for all providers (69.8% of OB/GYNs, 73.6% of GP/FPs and 50.7% of APNs).

Table 5 on page 3 describes the practices of OB/GYNs, GP/FPs and APNs regarding the medical/social history which is routinely obtained on their patients who are *women of childbearing age*. A very high percentage of these providers reported that a history of both sexually transmitted diseases (STDs) and drug use is solicited from these patients on a routine basis. Other risk behaviors, however, are less consistently evaluated.

Providers were questioned about provision of HIV/AIDS education to their childbearing-age female patients. In response, 23.7 percent of OB/GYNs, 19.0 percent of GP/FPs and 29.3 percent of APNs indicated that such education is provided to all patients who are women of childbearing age. In contrast, 10.4 percent of OB/GYNs and 21.4 percent of GP/FPs indicated that HIV/AIDS education is never provided to these patients. No APNs indicated that HIV/AIDS education is *never* provided to these patients.

Providers were additionally asked about provision of HIV counseling before a patient is tested for HIV infection. In response 90.8 percent of OB/GYNs, 83.3 percent of GP/FPs and 90.2 percent of APNs indicated that such pre-test counseling is routinely performed before HIV testing is undertaken.

The providers were asked to indicate which factors impaired or precluded the implementation of a comprehensive HIV education and testing program in their practice settings. Their responses are shown in Table 6. For each of the provider groups, the most frequently indicated factor impairing their ability to provide such a program was limited staff time (65.1% of OB/GYNs, 70.2% of GP/FPs and 69.1% of APNs). For OB/GYNs and GP/FPs, the second most frequently indicated factor was the perceived low risk of their patient population (this response was indicated by 37.3 percent of OB/GYNs and 50% of GP/FPs). Among APNs, the second most frequently mentioned factor

Table 6. Percentage of Survey Participants Who Indicated That Selected Factors Impaired or Precluded Implementation of a Comprehensive HIV Education/Counseling Program in Their Practice Setting by Type of Provider, Missouri, 1998.

Factor*	OB/GYN Physicians (n = 338)	GP/FP Physicians (n = 84)	Advanced Practice Nurses (n = 123)
Limited Staff Time	65.1%	70.2%	69.1%
Limited Physical Space	0.0%	0.0%	0.0%
No Money for Extra Staff	25.1%	32.1%	24.4%
Patient Population Low Risk/No Need	37.3%	50.0%	30.1%
Low Priority	7.4%	8.3%	0.8%
Lack of Training for Staff	24.6%	32.1%	31.7%
Something Else	6.2%	4.8%	4.1%

*Respondents were instructed to indicate all factors that applied to their practice/work setting.

Table 7. Categories of Pregnant Women Receiving Prenatal Care Who Are Routinely Offered HIV Testing by Type of Provider, Missouri, 1998.

Category of Pregnant Women*	OB/GYN Physicians (n = 338)	GP/FP Physicians (n = 84)	Advanced Practice Nurses (n = 123)
Those believed to be at increased HIV risk based on medical/social history	21.0%	17.9%	17.1%
Those believed to be at increased HIV risk based on physical exam/lab findings	12.4%	13.1%	16.3%
All pregnant women who present for care	84.6%	86.9%	87.0%
Other criteria	1.8%	1.2%	1.6%
HIV testing not routinely offered to any prenatal patients	0.9%	0.0%	0.8%

*Respondents were instructed to indicate all categories of pregnant patients who were routinely offered HIV testing.

interfering with implementation of a comprehensive HIV prevention program was lack of training for staff (this response was indicated by 31.7 percent of APNs).

Questions were asked about the specific practices of these providers with regard to their *pregnant patients*. Table 7 indicates those categories of pregnant women who are routinely offered HIV testing. Over 80 percent of all provider groups reported that testing is offered to all pregnant women presenting for care, regardless of perceived HIV risk (84.6% of OB/GYNs, 86.9 percent of GP/FPs and 87.0 percent of APNs).

Providers were asked what percentage of their pregnant patients *who are offered HIV testing* agree to be tested. Relatively high percentages of respondents (60.7% of OB/GYNs, 72.6% of GP/FPs and 65% of APNs) reported that 75% or more of pregnant patients who are offered testing for HIV consent to be tested. This included 19.8 percent of all OB/GYNs, 38.1 percent of all GP/FPs, and 13.8 percent of all APNs who indicated that 100 percent of their pregnant patients who are offered HIV testing agree to such testing.

Providers were asked whether a pregnant patient who is found to be infected with HIV would continue to receive prenatal care in their practice setting. Their responses are shown in Table 8. Those providers who indicated that an HIV-infected pregnant woman would, at least in some circumstances, continue to receive prenatal care in their practice setting (63.9% of OB/GYNs, 48.8% of GP/FPs and 45.6% of APNs) were then asked about the use of antiretroviral medication in pregnant women. This question, along with the percentage of participants who chose each of the possible answers, is shown in Table 9 on page 6.

Discussion

USPHS[5], along with professional groups such as the American College of Obstetricians and Gynecologists (ACOG)[6], the American Academy of Pediatrics (AAP)[6] and the American Medical Association (AMA)[7], recommended that all pregnant women receive HIV education and counseling, and then be voluntarily tested for HIV. Recent guidelines have been issued by USPHS on the use of antiretroviral medications to reduce the risk of perinatal HIV transmission[2] A 1996 policy statement from the Missouri Department of Health is in agreement with these recommendations[8], and the Missouri Perinatal Association has also expressed its support.[9] It is encouraging that a high proportion of respondents to the present survey agreed on the need for HIV risk assessment, education and counseling, as well as on the importance of HIV testing for pregnant women. A high proportion of respondents also agreed that ZDV can significantly reduce the risk of perinatal transmission of HIV.

There was much less agreement among survey respondents on whether there should be mandatory HIV testing of pregnant women, and mandatory antiretroviral treatment of those pregnant women who are HIV-infected. This is reflective of the ongoing societal debate on these issues. With regard to HIV testing, the Centers for Disease Control and Prevention (CDC) has stated that high levels of test acceptance can be achieved among women without mandating testing.[5] Evidence for this is less obvious in the present survey where, for example, only 38.1 percent of the GP/FPs reported that when HIV testing is offered to their pregnant patients, 100 percent of these women agree to be tested. The acceptance rates for HIV testing may reflect the manner in which HIV testing is presented.

The fact that approximately 25 percent of survey questionnaires were not returned requires that caution be exercised in attempting to generalize the results to all prenatal providers in Missouri. However, certain findings from the survey suggest opportunities for improvement in the knowledge and

(continued on page 6)

Table 8. Responses of Survey Participants to the Question of Whether an HIV-Infected Pregnant Woman Would Continue to Receive Prenatal Care in Their Practice Setting by Type of Provider, Missouri, 1998.

Response	OB/GYN Physicians (n = 338)	GP/FP Physicians (n = 84)	Advanced Practice Nurses (n = 123)
Continue to receive prenatal care (possibly in consultation with other professionals)	36.1%	23.8%	22.8%
Be referred to a provider in another practice setting to receive her prenatal care	35.5%	50.0%	53.6%
The decision on whether to continue to provide prenatal care (vs. referral to a provider in another practice setting) would be based on the women's stage of illness and/or other factors	27.8%	25.0%	22.8%
No response	0.6%	1.2%	0.8%

Table 9. Responses of Survey Participants* to a Clinical Question Regarding the Use of Antiretroviral Medication in an HIV-Infected Pregnant Woman by Type of Provider, Missouri, 1998.

If a pregnant woman receiving prenatal care is found to be HIV+, which of the following would most likely result?

Response	OB/GYN Physicians (n = 216)	GP/FP Physicians (n = 41)	Advanced Practice Nurses (n = 56)
Continue the combination antiretroviral therapy	46.3%	44.0%	16.1%
Switch from combination antiretroviral therapy to zidovudine (ZDV, AZT) monotherapy for the remainder of the pregnancy.	30.1%	31.7%	30.4%
Discontinue the combination antiretroviral therapy. If the woman's CD4+ count is <500 cells/mL, begin ZDV monotherapy and continue this regimen for the remainder of the pregnancy.	5.6%	7.3%	3.6%
Discontinue all antiretroviral drugs for the remainder of the pregnancy	0.0%	0.0%	0.0%
No response	18.1%	17.1%	50.0%

* Only respondents who indicated that they would, at least in some circumstances, continue to provide prenatal care in their practice setting to pregnant women known to be infected with HIV were asked to respond to this question.

(continued from page 5)
practices of providers with regard to HIV prevention:

- Some prenatal providers apparently remain unaware of the PACTG Protocol 076 study[1] and subsequent USPHS recommendations on antiretroviral use.[4]
- While most respondents appear to routinely evaluate their patients for a history of STDs and drug use, a small percentage do not. In addition, a sizable proportion of providers do not routinely evaluate their patients for HIV risk behaviors such as having multiple sexual partners, exchange of sex for money or drugs, and sexual contact with an injecting drug user.
- HIV/AIDS education is not uniformly provided to all female patients of childbearing age. Also, it appears that in some instances HIV counseling is not conducted before HIV testing is performed.[§]
- Although a relatively high proportion of respondents (approximately 75% of all three provider groups) routinely offer HIV testing to all their pregnant patients, there remain many providers who do not routinely offer such testing, despite the fact that it has been recommended by USPHS[5], ACOG[6], AAP[6] and AMA.[7]
- The clinical question shown in Table 9 was answered by respondents who stated they would provide prenatal care, at least in some circumstances, to HIV-infected pregnant women. For this question, answer 1 would be most consistent with current USPHS guidelines[4], which state that "HIV-1 infected women receiving antiretroviral therapy in whom pregnancy is identified after the first trimester should continue therapy." (The guidelines also indicate that "If the current therapeutic regimen does not contain ZDV, the addition of ZDV or substitution of ZDV for another nucleoside analogue antiretroviral is recommended after 14 weeks' gestation.") The relatively small proportion of respondents who chose this answer may reflect, in part, the fact that these guidelines had only very recently been published (the previous USPHS guidelines[10] had only discussed zidovudine monotherapy). The large percentage of respondents (especially among APNs) who did not provide a response to this question would appear to reflect unfamiliarity among many respondents with any of the guidelines on the use of antiretroviral drugs during pregnancy.

The challenge for public health officials, and for other persons and organizations concerned with the health of mothers and infants, is to find practical ways to assist prenatal providers (and medical providers generally) to maximize their HIV prevention efforts. The preceding section suggests specific problem areas towards which such assistance should be directed. In addition, the survey respondents identified certain general issues which, in many practice settings, will need to be addressed before an

(continued on page 27)

[§] Missouri law (191.653, RSMo) states all physicians, hospitals or other persons authorized by the Department of Health who perform or conduct HIV sampling shall provide consultation with the subject prior to taking the sample and during the reporting of the test results and shall report to the Department of Health the identity of any individual confirmed to be infected with HIV. The accompanying Department of Health rule (19 CSR 20-26.040) states that, where testing is done by a physician or a physician's delegated representative, the scope of the consultation shall be governed by the physician's professional judgment based on the clinical situation, including the purpose of and need for HIV testing, and shall be at least as comprehensive as the type of consultation provided for other diagnostic tests or procedures.

1998 Guidelines for Treatment of Sexually Transmitted Diseases

(Continued from the January-February, March-April and July-August 1998 issues of the *Missouri Epidemiologist*)

Physicians and other health-care providers have a critical role in preventing and treating sexually transmitted diseases (STDs). The following recommendations for the treatment of STDs, which were developed by the Centers for Disease Control and Prevention (CDC) in consultation with a group of outside experts, are intended to assist with that effort.

The recommendations, which update those released by CDC in 1993, were reprinted from CDC's *Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports*, Vol. 47, No. RR-1, January 23, 1998. This issue of the *Missouri Epidemiologist* contains those sections of the guidelines which relate to diseases characterized by vaginal discharge; pelvic inflammatory disease (PID); epididymitis; cervical cancer screening; proctitis, proctocolitis and enteritis; and ectoparasitic infections. Those sections relating to diseases characterized by urethritis and cervicitis were reprinted in the January-February 1998 issue, to diseases characterized by genital ulcers and congenital syphilis in the March-April 1998 issue and to human immunodeficiency virus (HIV) infection and human papillomavirus (HPV) infection in the July-August 1998 issue.

A full copy of the guidelines and reference list in pdf format can be found on CDC's Division of STD Prevention Home Page at **http://www.cdc.gov/nchstp/dstd/dstdp.htm.**

If you have questions regarding these guidelines, please contact DOH's Section of STD/HIV/AIDS Prevention and Care Services at (573) 751-6439.

Additional information for medical providers on STDs and STD training courses is available on the Internet at the following sites:

CDC's Division of STD Prevention:
http://www.cdc.gov/nchstp/dstd/dstdp.html

CDC's Division of HIV/AIDS Prevention:
http://www.cdc.gov/nchstp/hiv_aids/dhap.htm

CDC's Division of AIDS, STD, and TB Laboratory Research:
http://www.cdc.gov/ncidod/dastlr/dastlr.html

National Network of STD/HIV Prevention Training Centers:
http://129.137.232.101/STDPTC.html

St. Louis STD/HIV Prevention Training Center:
http://www.umsl.edu/services/itc/std_ptc.html
Ph: (314) 747-0294 or 747-1522

Medline - National Library of Medicine:
http://igm.nlm.nih.gov/

Diseases Characterized by Vaginal Discharge

Pelvic Inflammatory Disease (PID)

Epididymitis

Cervical Cancer Screening for Women Who Attend STD Clinics or Have a History of STDs

Proctitis, Proctocolitis and Enteritis

Ectoparasitic Infections

Diseases Characterized by Vaginal Discharge

MANAGEMENT OF PATIENTS WHO HAVE VAGINAL INFECTIONS

Vaginitis is usually characterized by a vaginal discharge or vulvar itching and irritation; a vaginal odor may be present. The three diseases most frequently associated with vaginal discharge are trichomoniasis (caused by *Trichomonas vaginalis*), bacterial vaginosis (BV) (caused by a replacement of the normal vaginal flora by an overgrowth of anaerobic microorganisms and *Gardnerella vaginalis*), and candidiasis (usually caused by *Candida albicans*). Mucopurulent cervicitis (MPC) caused by *Chlamydia trachomatis* or *Neisseria gonorrhoeae* can sometimes cause vaginal discharge. Although vulvovaginal candidiasis usually is not transmitted sexually, it is included in this section because it is often diagnosed in women being evaluated for STDs.

Vaginitis is diagnosed by pH and microscopic examination of fresh samples of the discharge. The pH of the vaginal secretions can be determined by narrow-range pH paper for the elevated pH typical of BV or trichomoniasis (i.e., a pH of >4.5). One way to examine the discharge is to dilute a sample in one to two drops of 0.9% normal saline solution on one slide and 10% potassium hydroxide (KOH) solution on a second slide. An amine odor detected immediately after applying KOH suggests BV. A cover slip is placed on each slide, and they are examined under a microscope at low- and high-dry power. The motile *T. vaginalis* or the clue cells of BV usually are identified easily in the saline specimen. The yeast or pseudohyphae of *Candida* species are more easily identified in the KOH specimen. The presence of objective signs of vulvar inflammation in the absence of vaginal pathogens, along with a minimal amount of discharge, suggests the possibility of mechanical, chemical, allergic, or other noninfectious irritation of the vulva. Culture for *T. vaginalis* is more sensitive than microscopic examination. Laboratory testing fails to identify the cause of vaginitis among a substantial minority of women.

BACTERIAL VAGINOSIS (BV)

BV is a clinical syndrome resulting from replacement of the normal H_2O_2-producing *Lactobacillus sp.* in the vagina with high concentrations of anaerobic bacteria (e.g., *Prevotella sp.* and *Mobiluncus sp.*), *G. vaginalis*, and *Mycoplasma hominis*. BV is the most prevalent cause of vaginal discharge or malodor; however, half of the women whose illnesses meet the clinical criteria for BV are asymptomatic. The cause of the microbial alteration is not fully understood. Although BV is associated with having multiple sex partners, it is unclear whether BV results from acquisition of a sexually transmitted pathogen. Women who have never been sexually active are rarely affected. Treatment of the male sex partner has not been beneficial in preventing the recurrence of BV.

Diagnostic Considerations

BV can be diagnosed by the use of clinical or Gram stain criteria. Clinical criteria require three of the following symptoms or signs:

a. A homogeneous, white, noninflammatory discharge that smoothly coats the vaginal walls;
b. The presence of clue cells on microscopic examination;
c. A pH of vaginal fluid >4.5;
d. A fishy odor of vaginal discharge before or after addition of 10% KOH (i.e., the whiff test).

When a Gram stain is used, determining the relative concentration of the bacterial morphotypes characteristic of the altered flora of BV is an acceptable laboratory method for diagnosing BV. Culture of *G. vaginalis* is not recommended as a diagnostic tool because it is not specific.

Treatment

The principal goal of therapy for BV is to relieve vaginal symptoms and signs of infection. All women who have symptomatic disease require treatment, regardless of pregnancy status.

BV during pregnancy is associated with adverse pregnancy outcomes. The results of several investigations indicate that treatment of pregnant women who have BV and who are at high risk for preterm delivery (i.e., those who previously delivered a premature infant) might reduce the risk for prematurity. Therefore, high-risk pregnant women who do not have symptoms of BV may be evaluated for treatment.

Although some experts recommend treatment for high-risk pregnant women who have asymptomatic BV, others believe more information is needed before such a recommendation is made. A large, randomized clinical trial is underway to assess treatment for asymptomatic BV in pregnant women; the results of this investigation should clarify the benefits of therapy for BV in women at both low and high risk for preterm delivery.

The bacterial flora that characterizes BV has been recovered from the endometria and salpinges of women who have pelvic inflammatory disease (PID). BV has been associated with endometritis, PID, and vaginal cuff cellulitis after invasive procedures such as endometrial biopsy, hysterectomy, hysterosalpingography, placement of an intrauterine device, cesarean section, and uterine curettage. The results of one randomized controlled trial indicated that treatment of BV with metronidazole substantially reduced postabortion PID. On the basis of these data, consideration should be given to treatment of women who have symptomatic or asymptomatic BV before surgical abortion procedures are performed. However, more information is needed before recommending whether patients who have asymptomatic BV should be treated before other invasive procedures are performed.

Recommended Regimens for Nonpregnant Women

(For treatment of pregnant women, see Bacterial Vaginosis, Special Considerations, Pregnancy.)

Metronidazole 500 mg orally twice a day for 7 days,

OR

Clindamycin cream 2%, one full applicator (5 g) intravaginally at bedtime for 7 days,

OR

Metronidazole gel 0.75%, one full applicator (5 g) intravaginally twice a day for 5 days.

NOTE: Patients should be advised to avoid consuming alcohol during treatment with metronidazole and for 24 hours thereafter. Clindamycin cream is oil-based and might weaken latex condoms and diaphragms. Refer to condom product labeling for additional information.

Alternative Regimens

Metronidazole 2 g orally in a single dose,

OR

Clindamycin 300 mg orally twice a day for 7 days.

Metronidazole 2-g single-dose therapy is an alternative regimen because of its lower efficacy for BV. Oral metronidazole (500 mg twice a day) is efficacious for the treatment of BV, resulting in relief of symptoms and improvement in clinical course and flora disturbances. Based on efficacy data from four randomized controlled trials, overall cure rates 4 weeks after completion of treatment did not differ significantly between the 7-day regimen of oral metronidazole and the clindamycin vaginal cream (78% vs. 82%, respectively). Similarly, the results of another randomized controlled trial indicated that cure rates 7–10 days after completion of treatment did not differ significantly between the 7-day regimen of oral metronidazole and the metronidazole vaginal gel (84% vs. 75%, respectively). FDA has approved Flagyl ER™ (750 mg) once daily for 7 days for treatment of BV. However, data concerning clinical equivalency with other regimens have not been published.

Some health-care providers remain concerned about the possible teratogenicity of metronidazole, which has been suggested by experiments using extremely high and prolonged doses in animals. However, a recent meta-analysis does not indicate teratogenicity in humans. Some health-care providers prefer the intravaginal route because of a lack of systemic side effects (e.g., mild-to-moderate gastrointestinal disturbance and unpleasant taste). Mean peak serum concentrations of metronidazole after intravaginal administration are <2% the levels of standard 500-mg oral doses, and the mean bioavailability of clindamycin cream is approximately 4%.

Follow-Up

Follow-up visits are unnecessary if symptoms resolve. Recurrence of BV is not unusual. Because treatment of BV in high-risk pregnant women who are asymptomatic might prevent adverse pregnancy outcomes, a follow-up evaluation, at 1 month after completion of treatment, should be considered to evaluate whether therapy was successful. The alternative BV treatment regimens may be used to treat recurrent disease. No long-term maintenance regimen with any therapeutic agent is recommended.

Management of Sex Partners

The results of clinical trials indicate that a woman's response to therapy and the likelihood of relapse or recurrence are not affected by treatment of her sex partner(s). Therefore, routine treatment of sex partners is not recommended.

Special Considerations

Allergy or Intolerance to the Recommended Therapy

Clindamycin cream is preferred in case of allergy or intolerance to metronidazole. Metronidazole gel can be considered for patients who do not tolerate systemic metronidazole, but patients allergic to oral metronidazole should not be administered metronidazole vaginally.

Pregnancy

BV has been associated with adverse pregnancy outcomes (e.g., premature rupture of the membranes, preterm labor, and preterm birth), and the organisms found in increased concentration in BV also are frequently present in postpartum or postcesarean endometritis. Because treatment of BV in high-risk pregnant women (i.e., those who have previously delivered a premature infant) who are asymptomatic might reduce preterm delivery, such women may be screened, and those with BV can be treated. The screening and treatment should be conducted at the earliest part of the second trimester of pregnancy. The recommended regimen is metronidazole 250 mg orally three times a day for 7 days. The alternative regimens are a) metronidazole 2 g orally in a single dose or b) clindamycin 300 mg orally twice a day for 7 days.

Low-risk pregnant women (i.e., women who previously have not had a premature delivery) who have symptomatic BV should be treated to relieve symptoms. The recommended regimen is metronidazole 250 mg orally three times a day for 7 days. The alternative regimens are a) metronidazole 2 g orally in a single dose; b) clindamycin 300 mg orally twice a day for 7 days; or c) metronidazole gel, 0.75%, one full applicator (5 g) intravaginally, twice a day for 5 days. Some experts prefer the use of systemic therapy for low-risk pregnant women to treat possible subclinical upper genital tract infections.

Lower doses of medication are recommended for pregnant women to minimize exposure to the fetus. Data are limited concerning the use of metronidazole vaginal gel during pregnancy. The use of clindamycin vaginal cream during pregnancy is not recommended, because two randomized trials indicated an increase in the number of preterm deliveries among pregnant women who were treated with this medication.

HIV Infection

Patients who have BV and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

TRICHOMONIASIS

Trichomoniasis is caused by the protozoan *T. vaginalis*. Most men who are infected with *T. vaginalis* do not have symptoms of infection, although a minority of men have NGU. Many women do have symptoms of infection. Of these women, *T. vaginalis* characteristically causes a diffuse, malodorous, yellow-green discharge with vulvar irritation; many women have fewer symptoms. Vaginal trichomoniasis might be associated with adverse pregnancy outcomes, particularly premature rupture of the membranes and preterm delivery.

Recommended Regimen
Metronidazole 2 g orally in a single dose.

Alternative Regimen*
Metronidazole 500 mg twice a day for 7 days.

*FDA has approved Flagyl 375™ mg twice a day for 7 days for treatment of trichomoniasis on the basis of pharmacokinetic equivalency of this regimen with metronidazole 250 mg three times a day for 7 days. No clinical data are available, however, to demonstrate clinical equivalency of the two regimens.

Metronidazole is the only oral medication available in the United States for the treatment of trichomoniasis. In randomized clinical trials, the recommended metronidazole regimens have resulted in cure rates of approximately 90%–95%; ensuring treatment of sex partners might increase the cure rate. Treatment of patients and sex partners results in relief of symptoms, microbiologic cure, and reduction of transmission. Metronidazole gel is approved for treatment of BV, but, like other topically applied antimicrobials that are unlikely to achieve therapeutic levels in the urethra or perivaginal glands, it is considerably less efficacious for treatment of trichomoniasis than oral preparations of metronidazole and is not recommended for use. Several other topically applied antimicrobials have been used for treatment of trichomoniasis, but it is unlikely that these preparations will have greater efficacy than metronidazole gel.

Follow-Up

Follow-up is unnecessary for men and women who become asymptomatic after treatment or who are initially asymptomatic. Infections with strains of *T. vaginalis* that have diminished susceptibility to metronidazole can occur; however, most of these organisms respond to higher doses of metronidazole. If treatment failure occurs with either regimen, the patient should be re-treated with metronidazole 500 mg twice a day for 7 days. If treatment failure occurs repeatedly, the patient should be treated with a single 2-g dose of metronidazole once a day for 3–5 days.

Patients with culture-documented infection who do not respond to the regimens described in this report and in whom reinfection has been excluded should be managed in consultation with an expert; consultation is available from CDC. Evaluation of such cases should include determination of the susceptibility of *T. vaginalis* to metronidazole.

Management of Sex Partners

Sex partners should be treated. Patients should be instructed to avoid sex until they and their sex partners are cured. In the absence of a microbiologic test of cure, this means when therapy has been completed and patient and partner(s) are asymptomatic.

Special Considerations

Allergy, Intolerance, or Adverse Reactions

Effective alternatives to therapy with metronidazole are not available. Patients who are allergic to metronidazole can be managed by desensitization (26).

Pregnancy

Patients can be treated with 2 g of metronidazole in a single dose.

HIV Infection

Patients who have trichomoniasis and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

VULVOVAGINAL CANDIDIASIS

Vulvovaginal candidiasis (VVC) is caused by *C. albicans* or, occasionally, by other *Candida sp.*, *Torulopsis sp.*, or other yeasts. An estimated 75% of women will have at least one episode of VVC, and 40%–45% will have two or more episodes. A small percentage of women (i.e., probably <5%) experience recurrent VVC (RVVC). Typical symptoms of VVC include pruritus and vaginal discharge. Other symptoms may include vaginal soreness, vulvar burning, dyspareunia, and external dysuria. None of these symptoms is specific for VVC.

Diagnostic Considerations

A diagnosis of *Candida* vaginitis is suggested clinically by pruritus and erythema in the vulvovaginal area; a white discharge may occur. The diagnosis can be made in a woman who has signs and symptoms of vaginitis, and when either a) a wet preparation or Gram stain of vaginal discharge demonstrates yeasts or pseudohyphae or b) a culture or other test yields a positive result for a yeast species. *Candida* vaginitis is associated with a normal vaginal pH (≤4.5). Use of 10% KOH in wet preparations improves the visualization of yeast and mycelia by disrupting cellular material

that might obscure the yeast or pseudohyphae. Identifying *Candida* by culture in the absence of symptoms should not lead to treatment, because approximately 10%–20% of women usually harbor *Candida sp*. and other yeasts in the vagina. VVC can occur concomitantly with STDs or frequently following antibacterial vaginal or systemic therapy.

Treatment

Topical formulations effectively treat VVC. The topically applied azole drugs are more effective than nystatin. Treatment with azoles results in relief of symptoms and negative cultures among 80%–90% of patients who complete therapy.

Recommended Regimens

Intravaginal agents:

Butoconazole 2% cream 5 g intravaginally for 3 days,* †

OR

Clotrimazole 1% cream 5 g intravaginally for 7–14 days,* †

OR

Clotrimazole 100 mg vaginal tablet for 7 days,*

OR

Clotrimazole 100 mg vaginal tablet, two tablets for 3 days,*

OR

Clotrimazole 500 mg vaginal tablet, one tablet in a single application,*

OR

Miconazole 2% cream 5 g intravaginally for 7 days,* †

OR

Miconazole 200 mg vaginal suppository, one suppository for 3 days,* †

OR

Miconazole 100 mg vaginal suppository, one suppository for 7 days,* †

OR

Nystatin 100,000-unit vaginal tablet, one tablet for 14 days,

OR

Tioconazole 6.5% ointment 5 g intravaginally in a single application,* †

OR

Terconazole 0.4% cream 5 g intravaginally for 7 days,*

OR

Terconazole 0.8% cream 5 g intravaginally for 3 days,*

OR

Terconazole 80 mg vaginal suppository, one suppository for 3 days.*

Oral agent:

Fluconazole 150 mg oral tablet, one tablet in single dose.

Preparations for intravaginal administration of butoconazole, clotrimazole, miconazole, and tioconazole are available over-the-counter (OTC), and women with VVC can choose one of those preparations. The duration for treatment with these preparations may be 1, 3, or 7 days. Self-medication with OTC preparations should be advised only for women who have been diagnosed previously with VVC and who have a recurrence of the same symptoms. Any woman whose symptoms persist after using an OTC preparation or who has a recurrence of symptoms within 2 months should seek medical care.

A new classification of VVC may facilitate antifungal selection as well as duration of therapy. Uncomplicated VVC (i.e., mild-to-moderate, sporadic, nonrecurrent disease in a normal host with normally susceptible *C. albicans*) responds to all the aforementioned azoles, even those that are short-term (<7 days) and single-dose therapies. In contrast, complicated VVC (i.e., severe local or recurrent VVC in an abnormal host [e.g., VVC in a patient who has uncontrolled diabetes, or infection caused by a less susceptible fungal pathogen such as *Candida glabrata*]) requires a longer duration of therapy (i.e, 10–14 days) with either topical or oral azoles. Additional studies confirming this approach are in progress.

* These creams and suppositories are oil-based and might weaken latex condoms and diaphragms. Refer to condom product labeling for additional information.

† Over-the-counter (OTC) preparations.

Alternative Regimens
Several trials have demonstrated that oral azole agents (e.g., ketoconazole and itraconazole) might be as effective as topical agents. The ease of administering oral agents is an advantage over topical therapies. However, the potential for toxicity associated with using a systemic drug, particularly ketoconazole, must be considered.

Follow-Up

Patients should be instructed to return for follow-up visits only if symptoms persist or recur.

Management of Sex Partners

VVC usually is not acquired through sexual intercourse; treatment of sex partners is not recommended but may be considered for women who have recurrent infection. A minority of male sex partners may have balanitis, which is characterized by erythematous areas on the glans in conjunction with pruritus or irritation. These sex partners might benefit from treatment with topical antifungal agents to relieve symptoms.

Special Considerations

Allergy or Intolerance to the Recommended Therapy

Topical agents usually are free of systemic side effects, although local burning or irritation may occur. Oral agents occasionally cause nausea, abdominal pain, and headaches. Therapy with the oral azoles has been associated rarely with abnormal elevations of liver enzymes. Hepatotoxicity secondary to ketoconazole therapy occurs in an estimated one of every 10,000–15,000 exposed persons. Clinically important interactions might occur when these oral agents are administered with other drugs, including astemizole, calcium channel antagonists, cisapride, coumadin, cyclosporin A, oral hypoglycemic agents, phenytoin, protease inhibitors, tacrolimus, terfenadine, theophylline, trimetrexate, and rifampin.

Pregnancy

VVC often occurs during pregnancy. Only topical azole therapies should be used to treat pregnant women. Of those treatments that have been investigated for use during pregnancy, the most effective are butoconazole, clotrimazole, miconazole, and terconazole. Many experts recommend 7 days of therapy during pregnancy.

HIV Infection

Prospective controlled studies are in progress to confirm an alleged increase in incidence of VVC in HIV-infected women. No confirmed evidence has indicated a differential response to conventional antifungal therapy among HIV-positive women who have VVC. As such, women who have acute VVC and also are infected with HIV should receive the same treatment regimens as those who are HIV-negative.

Recurrent Vulvovaginal Candidiasis

RVVC, which usually is defined as **four** or more episodes of symptomatic VVC annually, affects a small percentage of women (i.e., probably <5%). The pathogenesis of RVVC is poorly understood. Risk factors for RVVC include uncontrolled diabetes mellitus, immunosuppression, and corticosteroid use. In some women who have RVVC, episodes occur after repeated courses of topical or systemic antibacterials. However, this association is not apparent in the majority of women. Most women who have RVVC have no apparent predisposing conditions. Clinical trials addressing the management of RVVC have involved continuing therapy between episodes.

Treatment

The optimal treatment for RVVC has not been established; however, an initial intensive regimen continued for approximately 10–14 days, followed immediately by a maintenance regimen for at least 6 months, is recommended. Maintenance ketoconazole 100 mg orally, once a day for ≤6 months, reduces the frequency of RVVC episodes. Investigations are evaluating a weekly fluconazole regimen, the results of which will be compared with once-monthly oral and topical antimycotic regimens that have only moderate protective efficacy. All cases of RVVC should be confirmed by culture before maintenance therapy is initiated.

Although patients with RVVC should be evaluated for predisposing conditions, routinely performing HIV testing for women with RVVC who do not have HIV risk factors is unnecessary.

Follow-Up
Patients who are receiving treatment for RVVC should receive regular follow-up evaluations to monitor the effectiveness of therapy and the occurrence of side effects.

Management of Sex Partners
Treatment of sex partners may be considered for partners who have symptomatic balanitis or penile dermatitis. However, routine treatment of sex partners usually is unnecessary.

Special Considerations
HIV Infection
Information is insufficient to determine the optimal management of RVVC among HIV-infected women. Until such information becomes available, management should be the same as for HIV-negative women who have RVVC.

Pelvic Inflammatory Disease (PID)

Pelvic inflammatory disease (PID) comprises a spectrum of inflammatory disorders of the upper female genital tract, including any combination of endometritis, salpingitis, tubo-ovarian abscess, and pelvic peritonitis. Sexually transmitted organisms, especially *N. gonorrhoeae* and *C. trachomatis*, are implicated in most cases; however, microorganisms that can be part of the vaginal flora (e.g., anaerobes, *G. vaginalis*, *H. influenzae*, enteric Gram-negative rods, and *Streptococcus agalactiae*) also can cause PID. In addition, *M. hominis* and *U. urealyticum* might be etiologic agents of PID.

DIAGNOSTIC CONSIDERATIONS

Acute PID is difficult to diagnose because of the wide variation in the symptoms and signs. Many women with PID have subtle or mild symptoms that do not readily indicate PID. Consequently, delay in diagnosis and effective treatment probably contributes to inflammatory sequelae in the upper reproductive tract. Laparoscopy can be used to obtain a more accurate diagnosis of salpingitis and a more complete bacteriologic diagnosis. However, this diagnostic tool often is not readily available for acute cases, and its use is not easy to justify when symptoms are mild or vague. Moreover, laparoscopy will not detect endometritis and may not detect subtle inflammation of the fallopian tubes. Consequently, a diagnosis of PID usually is based on clinical findings.

The clinical diagnosis of acute PID also is imprecise. Data indicate that a clinical diagnosis of symptomatic PID has a positive predictive value (PPV) for salpingitis of 65%–90% in comparison with laparoscopy. The PPV of a clinical diagnosis of acute PID differs depending on epidemiologic characteristics and the clinical setting, with higher PPV among sexually active young (especially teenaged) women and among patients attending STD clinics or from settings in which rates of gonorrhea or chlamydia are high. In all settings, however, no single historical, physical, or laboratory finding is both sensitive and specific for the diagnosis of acute PID (i.e., can be used both to detect all cases of PID and to exclude all women without PID). Combinations of diagnostic findings that improve either sensitivity (i.e., detect more women who have PID) or specificity (i.e., exclude more women who do not have PID) do so only at the expense of the other. For example, requiring two or more findings excludes more women who do not have PID but also reduces the number of women with PID who are identified.

Many episodes of PID go unrecognized. Although some cases are asymptomatic, others are undiagnosed because the patient or the health-care provider fails to recognize the implications of mild or nonspecific symptoms or signs (e.g., abnormal bleeding, dyspareunia, or vaginal discharge [atypical PID]). Because of the difficulty of diagnosis and the potential for damage to the reproductive health of women even by apparently mild or atypical PID, health-care providers should maintain a low threshold for the diagnosis of PID. Even so, the long-term outcome of early treatment of women with asymptomatic or atypical PID is unknown. The following recommendations for diagnosing PID are intended to help health-care providers recognize when PID should be suspected and when they need to obtain additional information to increase diagnostic certainty. These recommendations are based partially on the fact that

diagnosis and management of other common causes of lower abdominal pain (e.g., ectopic pregnancy, acute appendicitis, and functional pain) are unlikely to be impaired by initiating empiric antimicrobial therapy for PID.

Empiric treatment of PID should be initiated in sexually active young women and others at risk for STDs if all the following **minimum criteria** are present and no other cause(s) for the illness can be identified:

- Lower abdominal tenderness,
- Adnexal tenderness, and
- Cervical motion tenderness.

More elaborate diagnostic evaluation often is needed, because incorrect diagnosis and management might cause unnecessary morbidity. These additional criteria may be used to enhance the specificity of the minimum criteria listed previously. **Additional criteria** that support a diagnosis of PID include the following:

- Oral temperature >101°F (>38.3°C),
- Abnormal cervical or vaginal discharge,
- Elevated erythrocyte sedimentation rate,
- Elevated C-reactive protein, and
- Laboratory documentation of cervical infection with *N. gonorrhoeae* or *C. trachomatis*.

The **definitive criteria** for diagnosing PID, which are warranted in selected cases, include the following:

- Histopathologic evidence of endometritis on endometrial biopsy,
- Transvaginal sonography or other imaging techniques showing thickened fluid-filled tubes with or without free pelvic fluid or tubo-ovarian complex, and
- Laparoscopic abnormalities consistent with PID.

Although treatment can be initiated before bacteriologic diagnosis of *C. trachomatis* or *N. gonorrhoeae* infection, such a diagnosis emphasizes the need to treat sex partners.

TREATMENT

PID treatment regimens must provide empiric, broad-spectrum coverage of likely pathogens. Antimicrobial coverage should include *N. gonorrhoeae*, *C. trachomatis*, anaerobes, Gram-negative facultative bacteria, and streptococci. Although several antimicrobial regimens have been effective in achieving a clinical and microbiologic cure in randomized clinical trials with short-term follow-up, few investigations have a) assessed and compared these regimens with regard to elimination of infection in the endometrium and fallopian tubes or b) determined the incidence of long-term complications (e.g., tubal infertility and ectopic pregnancy).

All regimens should be effective against *N. gonorrhoeae* and *C. trachomatis*, because negative endocervical screening does not preclude upper-reproductive tract infection. Although the need to eradicate anaerobes from women who have PID has not been determined definitively, the evidence suggests that this may be important. Anaerobic bacteria have been isolated from the upper-reproductive tract of women who have PID, and data from in vitro studies have revealed that anaerobes such as *Bacteroides fragilis* can cause tubal and epithelial destruction. In addition, BV also is diagnosed in many women who have PID. Until treatment regimens that do not adequately cover these microbes have been shown to prevent sequelae as well as the regimens that are effective against these microbes, the recommended regimens should have anaerobic coverage. Treatment should be initiated as soon as the presumptive diagnosis has been made, because prevention of long-term sequelae has been linked directly with immediate administration of appropriate antibiotics. When selecting a treatment regimen, health-care providers should consider availability, cost, patient acceptance, and antimicrobial susceptibility.

In the past, many experts recommended that all patients who had PID be hospitalized so that bed rest and supervised treatment with parenteral antibiotics could be initiated. However, hospitalization is no longer synonymous with parenteral therapy. No currently available data compare the efficacy of parenteral with oral therapy or inpatient with outpatient treatment settings. Until the results from ongoing trials comparing parenteral inpatient therapy with oral outpatient therapy for women who have mild PID are available, such decisions must be based on observational data

and consensus opinion. The decision of whether hospitalization is necessary should be based on the discretion of the health-care provider.

The following criteria for **HOSPITALIZATION** are based on observational data and theoretical concerns:

- Surgical emergencies such as appendicitis cannot be excluded;
- The patient is pregnant;
- The patient does not respond clinically to oral antimicrobial therapy;
- The patient is unable to follow or tolerate an outpatient oral regimen;
- The patient has severe illness, nausea and vomiting, or high fever;
- The patient has a tubo-ovarian abscess; or
- The patient is immunodeficient (i.e., has HIV infection with low CD4 counts, is taking immunosuppressive therapy, or has another disease).

Most clinicians favor at least 24 hours of direct inpatient observation for patients who have tubo-ovarian abscesses, after which time home parenteral therapy should be adequate.

There are no efficacy data comparing parenteral with oral regimens. Experts have extensive experience with both of the following regimens. Also, there are multiple randomized trials demonstrating the efficacy of each regimen. Although most trials have used parenteral treatment for at least 48 hours after the patient demonstrates substantial clinical improvement, this is an arbitrary designation. Clinical experience should guide decisions regarding transition to oral therapy, which may be accomplished within 24 hours of clinical improvement.

Parenteral Regimen A

Cefotetan 2 g IV every 12 hours,

OR

Cefoxitin 2 g IV every 6 hours,

PLUS

Doxycycline 100 mg IV or orally every 12 hours.

NOTE: Because of pain associated with infusion, doxycycline should be administered orally when possible, even when the patient is hospitalized. Both oral and IV administration of doxycycline provide similar bioavailability. In the event that IV administration is necessary, use of lidocaine or other short-acting local anesthetic, heparin, or steroids with a steel needle or extension of the infusion time may reduce infusion complications. Parenteral therapy may be discontinued 24 hours after a patient improves clinically, and oral therapy with doxycycline (100 mg twice a day) should continue for a total of 14 days. When tubo-ovarian abscess is present, many health-care providers use clindamycin or metronidazole with doxycycline for continued therapy rather than doxycycline alone, because it provides more effective anaerobic coverage.

Clinical data are limited regarding the use of other second- or third-generation cephalosporins (e.g., ceftizoxime, cefotaxime, and ceftriaxone), which also might be effective therapy for PID and might replace cefotetan or cefoxitin. However, they are less active than cefotetan or cefoxitin against anaerobic bacteria.

Parenteral Regimen B

Clindamycin 900 mg IV every 8 hours,

PLUS

Gentamicin loading dose IV or IM (2 mg/kg of body weight), followed by a maintenance dose (1.5 mg/kg) every 8 hours. Single daily dosing may be substituted.

NOTE: Although use of a single daily dose of gentamicin has not been evaluated for the treatment of PID, it is efficacious in other analogous situations. Parenteral therapy may be discontinued 24 hours after a patient improves clinically, and continuing oral therapy should consist of doxycycline 100 mg orally twice a day or clindamycin 450 mg orally four times a day to complete a total of 14 days of therapy. When tubo-ovarian abscess is present, many health-care providers use clindamycin for continued therapy rather than doxycycline, because clindamycin provides more effective anaerobic coverage.

Alternative Parenteral Regimens

Limited data support the use of other parenteral regimens, but the following three regimens have been investigated in at least one clinical trial, and they have broad spectrum coverage.

Ofloxacin 400 mg IV every 12 hours,

PLUS

Metronidazole 500 mg IV every 8 hours.

OR

Ampicillin/Sulbactam 3 g IV every 6 hours,

PLUS

Doxycycline 100 mg IV or orally every 12 hours.

OR

Ciprofloxacin 200 mg IV every 12 hours,

PLUS

Doxycycline 100 mg IV or orally every 12 hours,

PLUS

Metronidazole 500 mg IV every 8 hours.

Ampicillin/sulbactam plus doxycycline has good coverage against *C. trachomatis*, *N. gonorrhoeae*, and anaerobes and appears to be effective for patients who have tubo-ovarian abscess. Both IV ofloxacin and ciprofloxacin have been investigated as single agents. Because ciprofloxacin has poor coverage against *C. trachomatis*, it is recommended that doxycycline be added routinely. Because of concerns regarding the anaerobic coverage of both quinolones, metronidazole should be included with each regimen.

ORAL TREATMENT

As with parenteral regimens, clinical trials of outpatient regimens have provided minimal information regarding intermediate and long-term outcomes. The following regimens provide coverage against the frequent etiologic agents of PID, but evidence from clinical trials supporting their use is limited. Patients who do not respond to oral therapy within 72 hours should be reevaluated to confirm the diagnosis and be administered parenteral therapy on either an outpatient or inpatient basis.

Regimen A

Ofloxacin 400 mg orally twice a day for 14 days,

PLUS

Metronidazole 500 mg orally twice a day for 14 days.

Oral ofloxacin has been investigated as a single agent in two well-designed clinical trials, and it is effective against both *N. gonorrhoeae* and *C. trachomatis*. Despite the results of these trials, ofloxacin's lack of anaerobic coverage is a concern; the addition of metronidazole provides this coverage.

Regimen B

Ceftriaxone 250 mg IM once,

OR

Cefoxitin 2 g IM plus **Probenecid** 1 g orally in a single dose concurrently once,

OR

Other parenteral third-generation **cephalosporin** (e.g., **ceftizoxime** or **cefotaxime**),

PLUS

Doxycycline 100 mg orally twice a day for 14 days. (Include this regimen with one of the above regimens.)

The optimal choice of a cephalosporin for Regimen B is unclear; although cefoxitin has better anaerobic coverage, ceftriaxone has better coverage against *N. gonorrhoeae*. Clinical trials have demonstrated that a single dose of cefoxitin is effective in obtaining short-term clinical response in women who have PID; however, the theoretical limitations in its coverage of anaerobes may require the addition of metronidazole. The metronidazole also will effectively treat BV, which also is frequently associated with PID. No data have been published regarding the use of oral cephalosporins for the treatment of PID.

Alternative Oral Regimens

Information regarding other outpatient regimens is limited, but one other regimen has undergone at least one clinical trial and has broad spectrum coverage. Amoxicillin/clavulanic acid plus doxycycline was effective in obtaining short-term clinical response in a single clinical trial; however, gastrointestinal symptoms might limit the overall success of this regimen. Several recent investigations have evaluated the use of azithromycin in the treatment of upper-reproductive tract infections; however, the data are insufficient to recommend this agent as a component of any of the treatment regimens for PID.

FOLLOW-UP

Patients receiving oral or parenteral therapy should demonstrate substantial clinical improvement (e.g., defervescence; reduction in direct or rebound abdominal tenderness; and reduction in uterine, adnexal, and cervical motion tenderness) within 3 days after initiation of therapy. Patients who do not demonstrate improvement within this time period usually require additional diagnostic tests, surgical intervention, or both.

If the health-care provider prescribes outpatient oral or parenteral therapy, a follow-up examination should be performed within 72 hours, using the criteria for clinical improvement described previously. Some experts also recommend rescreening for *C. trachomatis* and *N. gonorrhoeae* 4–6 weeks after therapy is completed. If PCR or LCR is used to document a test of cure, rescreening should be delayed for 1 month after completion of therapy.

MANAGEMENT OF SEX PARTNERS

Sex partners of patients who have PID should be examined and treated if they had sexual contact with the patient during the 60 days preceding onset of symptoms in the patient. The evaluation and treatment are imperative because of the risk for reinfection and the strong likelihood of urethral gonococcal or chlamydial infection in the sex partner. Male partners of women who have PID caused by *C. trachomatis* and/or *N. gonorrhoeae* often are asymptomatic.

Sex partners should be treated empirically with regimens effective against both of these infections, regardless of the apparent etiology of PID or pathogens isolated from the infected woman.

Even in clinical settings in which only women are treated, special arrangements should be made to provide care for male sex partners of women who have PID. When this is not feasible, health-care providers should ensure that sex partners are referred for appropriate treatment.

SPECIAL CONSIDERATIONS

Pregnancy

Because of the high risk for maternal morbidity, fetal wastage, and preterm delivery, pregnant women who have suspected PID should be hospitalized and treated with parenteral antibiotics.

HIV Infection

Differences in the clinical manifestations of PID between HIV-infected women and HIV-negative women have not been well delineated. In early observational studies, HIV-infected women with PID were more likely to require surgical intervention. In a subsequent and more comprehensive observational study, HIV-infected women who had PID had more severe symptoms than HIV-negative women but responded equally well to standard parenteral antibiotic regimens. In another study, the microbiologic findings for HIV-infected and HIV-negative women were similar, except for higher rates of concomitant *Candida* and HPV infections and HPV-related cytologic abnormalities among HIV-infected women. Immunosuppressed HIV-infected women who have PID should be managed aggressively using one of the parenteral antimicrobial regimens recommended in this report.

EPIDIDYMITIS

Among sexually active men aged <35 years, epididymitis is most often caused by *C. trachomatis* or *N. gonorrhoeae*. Epididymitis caused by sexually transmitted *E. coli* infection also occurs among homosexual men who are the insertive partners during anal intercourse. Sexually transmitted epididymitis usually is accompanied by urethritis, which often is asymptomatic. Nonsexually transmitted epididymitis associated with urinary tract infections caused by Gram-negative enteric organisms occurs more frequently among men aged >35 years, men who have recently undergone urinary tract instrumentation or surgery, and men who have anatomical abnormalities.

Although most patients can be treated on an outpatient basis, hospitalization should be considered when severe pain suggests other diagnoses (e.g., torsion, testicular infarction, and abscess) or when patients are febrile or might be noncompliant with an antimicrobial regimen.

DIAGNOSTIC CONSIDERATIONS

Men who have epididymitis typically have unilateral testicular pain and tenderness; hydrocele and palpable swelling of the epididymis usually are present. Testicular torsion, a surgical emergency, should be considered in all cases but is more frequent among adolescents. Torsion occurs more frequently in patients who do not have evidence of inflammation or infection. Emergency testing for torsion may be indicated when the onset of pain is sudden, pain is severe, or the test results available during the initial examination do not enable a diagnosis of urethritis or urinary tract infection to be made. If the diagnosis is questionable, an expert should be consulted immediately, because testicular viability may be compromised. The evaluation of men for epididymitis should include the following procedures:

- A Gram-stained smear of urethral exudate or intraurethral swab specimen for diagnosis of urethritis (i.e., ≥5 polymorphonuclear leukocytes per oil immersion field) and for presumptive diagnosis of gonococcal infection.
- A culture of urethral exudate or intraurethral swab specimen, or nucleic acid amplification test (either on intraurethral swab or first-void urine) for *N. gonorrhoeae* and *C. trachomatis*.
- Examination of first-void urine for leukocytes if the urethral Gram stain is negative. Culture and Gram-stained smear of uncentrifuged urine should be obtained.
- Syphilis serology and HIV counseling and testing.

TREATMENT

Empiric therapy is indicated before culture results are available. Treatment of epididymitis caused by *C. trachomatis* or *N. gonorrhoeae* will result in a) a microbiologic cure of infection, b) improvement of the signs and symptoms, c) prevention of transmission to others, and d) a decrease in the potential complications (e.g., infertility or chronic pain).

Recommended Regimens

For epididymitis most likely caused by gonococcal or chlamydial infection:

Ceftriaxone 250 mg IM in a single dose,

PLUS

Doxycycline 100 mg orally twice a day for 10 days.

For epididymitis most likely caused by enteric organisms,
or for patients allergic to cephalosporins and/or tetracyclines:

Ofloxacin 300 mg orally twice a day for 10 days.

As an adjunct to therapy, bed rest, scrotal elevation, and analgesics are recommended until fever and local inflammation have subsided.

FOLLOW-UP

Failure to improve within 3 days requires reevaluation of both the diagnosis and therapy. Swelling and tenderness that persist after completion of antimicrobial therapy should be evaluated comprehensively. The differential diagnosis includes tumor, abscess, infarction, testicular cancer, and tuberculous or fungal epididymitis.

MANAGEMENT OF SEX PARTNERS

Patients who have epididymitis that is known or suspected to be caused by *N. gonorrhoeae* or *C. trachomatis* should be instructed to refer sex partners for evaluation and treatment. Sex partners of these patients should be referred if their contact with the index patient was within the 60 days preceding onset of symptoms in the patient.

Patients should be instructed to avoid sexual intercourse until they and their sex partners are cured. In the absence of a microbiologic test of cure, this means until therapy is completed and patient and partner(s) no longer have symptoms.

SPECIAL CONSIDERATIONS

HIV Infection

Patients who have uncomplicated epididymitis and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative. Fungi and mycobacteria, however, are more likely to cause epididymitis in immunosuppressed patients than in immunocompetent patients.

Cervical Cancer Screening for Women Who Attend STD Clinics or Have a History of STDs

Women who have a history of STD are at increased risk for cervical cancer, and women attending STD clinics may have other risk factors that place them at even greater risk. Prevalence studies have determined that precursor lesions for cervical cancer occur about five times more frequently among women attending STD clinics than among women attending family planning clinics.

The Pap smear (i.e., cervical smear) is an effective and relatively low-cost screening test for invasive cervical cancer and squamous intraepithelial lesions (SIL),* the precursors of cervical cancer. Both ACOG and the American Cancer Society (ACS) recommend annual Pap smears for all sexually active women. Although these guidelines take the position that Pap smears can be obtained less frequently in some situations, women with a history of STDs may need more frequent screening because of their increased risk for cervical cancer. Moreover, surveys of women attending STD clinics indicate that many women do not understand the purpose or importance of Pap smears, and almost half of the women who have had a pelvic examination erroneously believe they have had a Pap smear when they actually have not.

RECOMMENDATIONS

At the time of a pelvic examination for STD screening, the health-care provider should inquire about the result of the patient's last Pap smear and discuss the following information with the patient:

- The purpose and importance of a Pap smear;
- Whether a Pap smear was obtained during the clinic visit;
- The need for an annual Pap smear; and
- The names of local providers or referral clinics that can obtain Pap smears and adequately follow up results (i.e., if a Pap smear was not obtained during this examination).

If a woman has not had a Pap smear during the previous 12 months, a Pap smear should be obtained as part of the routine pelvic examination. Health-care providers should be aware that, after a pelvic examination, many women believe they have had a Pap smear when they actually have not, and thus may report having had a recent Pap smear. Therefore, in STD clinics, a Pap smear should be strongly considered during the routine clinical evaluation of women who have not had a normal Pap smear within the preceding 12 months that is documented within the clinic record or linked-system record.

*The 1988 *Bethesda System for Reporting Cervical/Vaginal Cytologic Diagnoses* introduced the terms "low-grade SIL" and "high-grade SIL" (27). Low-grade SIL encompasses cellular changes associated with HPV and mild dysplasia/cervical intraepithelial neoplasia 1 (CIN 1). High-grade SIL includes moderate dysplasia/CIN 2, severe dysplasia/CIN 3, and carcinoma in situ/CIN 3.

A woman may benefit from receiving printed information about Pap smears and a report containing a statement that a Pap smear was obtained during her clinic visit. If possible, a copy of the Pap smear result should be provided to the patient for her records.

FOLLOW-UP

Clinics and health-care providers who provide Pap smear screening services are encouraged to use cytopathology laboratories that report results using the Bethesda System of classification. If the results of the Pap smear are abnormal, care should be provided according to the *Interim Guidelines for Management of Abnormal Cervical Cytology* published by the National Cancer Institute Consensus Panel and briefly summarized below (27). Appropriate follow-up of Pap smears showing a high-grade SIL always includes referral to a clinician who has the capacity to provide a colposcopic examination of the lower genital tract and, if indicated, colposcopically directed biopsies. For a Pap smear showing low-grade SIL or atypical squamous cells of undetermined significance (ASCUS), follow-up without colposcopy *may* be acceptable in circumstances when the diagnosis is not qualified further or the cytopathologist favors a reactive process. In general, this would involve repeated Pap smears every 4–6 months for 2 years until the results of three consecutive smears have been negative. If repeated smears show persistent abnormalities, colposcopy and directed biopsy are indicated for low-grade SIL and should be considered for ASCUS. Women with a diagnosis of unqualified ASCUS associated with severe inflammation should at least be reevaluated with a repeat Pap smear after 2–3 months, then repeated Pap smears every 4–6 months for 2 years until the results of three consecutive smears have been negative. If specific infections are identified, the patient should be reevaluated after appropriate treatment for those infections. In all follow-up strategies using repeated Pap smears, the tests not only must be negative but also must be interpreted by the laboratory as "satisfactory for evaluation."

Because many public health clinics, including most STD clinics, cannot provide clinical follow-up of abnormal Pap smears with colposcopy and biopsy, women with Pap smears demonstrating high grade SIL or persistent low-grade SIL or ASCUS usually will need a referral to other local health-care providers or clinics for colposcopy and biopsy. Clinics and health-care providers who offer Pap smear screening services but cannot provide appropriate colposcopic follow-up of abnormal Pap smears should arrange referral services that a) can promptly evaluate and treat patients and b) will report the results of the evaluation to the referring clinician or health-care provider. Clinics and health-care providers should develop protocols that identify women who miss initial appointments (i.e., so that these women can be scheduled for repeat Pap smears), and they should reevaluate such protocols routinely. Pap smear results, type and location of follow-up appointments, and results of follow-up should be clearly documented in the clinic record. The development of colposcopy and biopsy services in local health departments, especially in circumstances where referrals are difficult and follow-up is unlikely, should be considered.

OTHER MANAGEMENT CONSIDERATIONS

Other considerations in performing Pap smears are as follows:

- The Pap smear is not an effective screening test for STDs.
- If a woman is menstruating, a Pap smear should be postponed, and the woman should be advised to have a Pap smear at the earliest opportunity.
- The presence of a mucopurulent discharge might compromise interpretation of the Pap smear. However, if the woman is unlikely to return for follow-up, a Pap smear can be obtained after careful removal of the discharge with a saline-soaked cotton swab.
- A woman who has external genital warts does not need to have Pap smears more frequently than a woman who does not have warts, unless otherwise indicated.
- In an STD clinic setting or when other cultures or specimens are collected for STD diagnoses, the Pap smear may be obtained last.
- Women who have had a hysterectomy do not require an annual Pap smear unless the hysterectomy was related to cervical cancer or its precursor lesions. In this situation, women should be advised to continue follow-up with the physician(s) who provided health care at the time of the hysterectomy.
- Both health-care providers who receive basic retraining on Pap smear collection and clinics that use simple quality assurance measures obtain fewer unsatisfactory smears.
- Although type-specific HPV testing to identify women at high and low risk for cervical cancer may become clinically relevant in the future, its utility in clinical practice is unclear, and such testing is not recommended.

SPECIAL CONSIDERATIONS

Pregnancy

Women who are pregnant should have a Pap smear as part of routine prenatal care. A cytobrush may be used for obtaining Pap smears in pregnant women, although care should be taken not to disrupt the mucous plug.

HIV Infection

Several studies have documented an increased prevalence of SIL in HIV-infected women, and HIV is believed by many experts to hasten the progression of precursor lesions to invasive cervical cancer. The following recommendations for Pap smear screening among HIV-infected women are consistent with other guidelines published by the U.S. Department of Health and Human Services (10,11,27,28) and are based partially on the opinions of experts in the care and management of cervical cancer and HIV infection in women.

- After obtaining a complete history of previous cervical disease, HIV-infected women should have a comprehensive gynecologic examination, including a pelvic examination and Pap smear as part of their initial evaluation. A Pap smear should be obtained twice in the first year after diagnosis of HIV infection and, if the results are normal, annually thereafter. If the results of the Pap smear are abnormal, care should be provided according to the *Interim Guidelines for Management of Abnormal Cervical Cytology* (28). Women who have a cytological diagnosis of high-grade SIL or squamous cell carcinoma should undergo colposcopy and directed biopsy. HIV infection is not an indication for colposcopy in women who have normal Pap smears.

Proctitis, Proctocolitis and Enteritis

Sexually transmitted gastrointestinal syndromes include proctitis, proctocolitis, and enteritis. Proctitis occurs predominantly among persons who participate in anal intercourse, and enteritis occurs among those whose sexual practices include oral-fecal contact. Proctocolitis can be acquired by either route, depending on the pathogen. Evaluation should include appropriate diagnostic procedures (e.g., anoscopy or sigmoidoscopy, stool examination, and culture).

Proctitis is an inflammation limited to the rectum (the distal 10–12 cm) that is associated with anorectal pain, tenesmus, and rectal discharge. *N. gonorrhoeae*, *C. trachomatis* (including LGV serovars), *T. pallidum*, and HSV usually are the sexually transmitted pathogens involved. In patients coinfected with HIV, herpes proctitis may be especially severe.

Proctocolitis is associated with symptoms of proctitis plus diarrhea and/or abdominal cramps and inflammation of the colonic mucosa extending to 12 cm. Fecal leukocytes may be detected on stool examination depending on the pathogen. Pathogenic organisms include *Campylobacter sp.*, *Shigella sp.*, *Entamoeba histolytica*, and, rarely, *C. trachomatis* (LGV serovars). CMV or other opportunistic agents may be involved in immunosuppressed HIV-infected patients.

Enteritis usually results in diarrhea and abdominal cramping without signs of proctitis or proctocolitis. In otherwise healthy patients, *Giardia lamblia* is most frequently implicated. Among HIV-infected patients, other infections that usually are not sexually transmitted may occur, including CMV, *Mycobacterium avium- intracellulare*, *Salmonella sp.*, *Cryptosporidium*, *Microsporidium*, and *Isospora*. Multiple stool examinations may be necessary to detect *Giardia*, and special stool preparations are required to diagnose cryptosporidiosis and microsporidiosis. Additionally, enteritis may be a primary effect of HIV infection.

When laboratory diagnostic capabilities are available, treatment should be based on the specific diagnosis. Diagnostic and treatment recommendations for all enteric infections are beyond the scope of these guidelines.

TREATMENT

Acute proctitis of recent onset among persons who have recently practiced receptive anal intercourse is most often sexually transmitted. Such patients should be examined by anoscopy and should be evaluated for infection with HSV,

N. gonorrhoeae, *C. trachomatis*, and *T. pallidum*. If anorectal pus is found on examination, or if polymorphonuclear leukocytes are found on a Gram-stained smear of anorectal secretions, the following therapy may be prescribed pending results of additional laboratory tests.

Recommended Regimen

Ceftriaxone 125 mg IM (or another agent effective against anal and genital gonorrhea),

PLUS

Doxycycline 100 mg orally twice a day for 7 days.

NOTE: For patients who have herpes proctitis, refer to Genital Herpes Simplex Virus (HSV) Infection.

FOLLOW-UP

Follow-up should be based on specific etiology and severity of clinical symptoms. Reinfection may be difficult to distinguish from treatment failure.

MANAGEMENT OF SEX PARTNERS

Sex partners of patients who have sexually transmitted enteric infections should be evaluated for any diseases diagnosed in the patient.

ECTOPARASITIC INFECTIONS

PEDICULOSIS PUBIS

Patients who have pediculosis pubis (i.e., pubic lice) usually seek medical attention because of pruritus. Such patients also usually notice lice or nits on their pubic hair.

Recommended Regimens

Permethrin 1% creme rinse applied to affected areas and washed off after 10 minutes.

OR

Lindane 1% shampoo applied for 4 minutes to the affected area, and then thoroughly washed off. This regimen is not recommended for pregnant or lactating women or for children aged <2 years.

OR

Pyrethrins with piperonyl butoxide applied to the affected area and washed off after 10 minutes.

The lindane regimen is the least expensive therapy; toxicity, as indicated by seizure and aplastic anemia, has not been reported when treatment was limited to the recommended 4-minute period. Permethrin has less potential for toxicity than lindane.

Other Management Considerations

The recommended regimens should not be applied to the eyes. Pediculosis of the eyelashes should be treated by applying occlusive ophthalmic ointment to the eyelid margins twice a day for 10 days.

Bedding and clothing should be decontaminated (i.e., either machine-washed or machine-dried using the heat cycle or dry-cleaned) or removed from body contact for at least 72 hours. Fumigation of living areas is not necessary.

Follow-Up

Patients should be evaluated after 1 week if symptoms persist. Re-treatment may be necessary if lice are found or if eggs are observed at the hair-skin junction. Patients who do not respond to one of the recommended regimens should be retreated with an alternative regimen.

Management of Sex Partners

Sex partners within the preceding month should be treated.

Special Considerations

Pregnancy

Pregnant and lactating women should be treated with either permethrin or pyrethrins with piperonyl butoxide.

HIV Infection

Patients who have pediculosis pubis and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

SCABIES

The predominant symptom of scabies is pruritus. Sensitization to *Sarcoptes scabiei* must occur before pruritus begins. The first time a person is infected with *S. scabiei*, sensitization takes several weeks to develop. Pruritus might occur within 24 hours after a subsequent reinfestation. Scabies in adults may be sexually transmitted, although scabies in children usually is not.

Recommended Regimen

Permethrin cream (5%) applied to all areas of the body from the neck down and washed off after 8–14 hours.

Alternative Regimens

Lindane (1%) 1 oz. of lotion or 30 g of cream applied thinly to all areas of the body from the neck down and thoroughly washed off after 8 hours.

OR

Sulfur (6%) precipitated in ointment applied thinly to all areas nightly for 3 nights. Previous applications should be washed off before new applications are applied. Thoroughly wash off 24 hours after the last application.

Permethrin is effective and safe but costs more than lindane. Lindane is effective in most areas of the country, but lindane resistance has been reported in some areas of the world, including parts of the United States. Seizures have occurred when lindane was applied after a bath or used by patients who had extensive dermatitis. Aplastic anemia following lindane use also has been reported.

NOTE: Lindane should not be used after a bath, and it should not be used by a) persons who have extensive dermatitis, b) pregnant or lactating women, and c) children aged <2 years.

Ivermectin (single oral dose of 200 μg/kg or 0.8% topical solution) is a potential new therapeutic modality. However, no controlled clinical trials have been conducted to compare ivermectin with the currently recommended therapies.

Other Management Considerations

Bedding and clothing should be decontaminated (i.e., either machine-washed or machine-dried using the hot cycle or dry-cleaned) or removed from body contact for at least 72 hours. Fumigation of living areas is unnecessary.

Follow-Up

Pruritus may persist for several weeks. Some experts recommend re-treatment after 1 week for patients who are still symptomatic; other experts recommend re-treatment only if live mites are observed. Patients who do not respond to the recommended treatment should be retreated with an alternative regimen.

Management of Sex Partners and Household Contacts

Both sexual and close personal or household contacts within the preceding month should be examined and treated.

Management of Outbreaks in Communities, Nursing Homes, and Other Institutional Settings

Scabies epidemics often occur in nursing homes, acute- and chronic-care hospitals, residential facilities, and communities. Control of an epidemic can only be achieved by treatment of the entire population at risk. Epidemics should be managed in consultation with an expert.

Special Considerations

Infants, Young Children, and Pregnant or Lactating Women

Infants, young children, and pregnant or lactating women should not be treated with lindane. They may be treated with permethrin.

HIV Infection

Patients who have uncomplicated scabies and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative. HIV-infected patients and others who are immunosuppressed are at increased risk for Norwegian scabies, a disseminated dermatologic infection. Such patients should be managed in consultation with an expert.

Medical providers play a vital role in the prevention and control of sexually transmitted diseases (STDs). Providers can help significantly reduce the occurrence of these diseases by:

- **Evaluating each patient, as appropriate, for evidence of STDs, and for evidence of high-risk sexual behaviors.**
- **Promptly diagnosing and treating patients with STDs according to current guidelines.**
- **Providing appropriate follow-up after patients have been treated.**
- **Providing education and counseling to patients engaging in high-risk sexual behaviors.**
- **Promptly reporting, as required by Missouri law, all cases of chlamydial infection, gonorrhea, syphilis, and hepatitis B to the local health department, or to the Missouri Department of Health (DOH) at (573) 751-6463.**

  Reports of cases of HIV infection/AIDS should be made as follows:
  - **Health care providers in St. Louis City and St. Louis County should report the individual to the St. Louis City Department of Health and Hospitals at (314) 658-1159.**
  - **Providers in the five-county Kansas City metropolitan area should report to the Kansas City Health Department at (816) 983-4200.**
  - **All other providers should report to DOH's Office of Surveillance at (573) 751-6463.**

Chlamydia pneumoniae and Coronary Heart Disease

Reprinted with permission from the Kansas City Health Department Community and Hospital Letter, August 1998, Vol. 19, No. 1. Gerald L. Hoff, Ph.D., F.A.C.E., Editor

Cardiovascular disease is the chief cause of death in the United States and western Europe, and atherosclerosis, the principal cause of myocardial and cerebral infarction, accounts for the majority of these deaths (N Engl J Med 314:488, 1986). Approximately 50 million Americans have cardiovascular disease, with a prevalence in middle age exceeding 61/100,000. In 1997, there were 2.3 million deaths attributed to myocardial infarction, 50% of all deaths in the United States (Curr Opinion Infect Dis 11:301, 1998).

A major topic of debate is whether or not the pathogenesis of atherosclerosis is the result of an infectious disease process involving *Chlamydia pneumoniae* (Infection 25:281, 1997). There is substantial evidence including sero-epidemiological studies, electron microscopy, immunocytochemistry, molecular detection assays, direct culture of the agent from pathological tissue, animal models and treatment trials that demonstrate both the presence of *C. pneumoniae* in diseased tissue and that some patients with atherosclerosis benefit from treatment with antibiotics (Can J Infect Dis 8:249, 1997; Circulation 96:404, 1997; Hippocrates 11:42, 1997). Still unanswered is whether the organism plays an etiologic role, serves as a cofactor, or is an innocent bystander in the development of coronary heart disease. Further complicating the picture is a recent serological study that links *C. pneumoniae* to hypertension (Hypertension 31:589, 1998).

Discovered in 1965, but firmly identified only a decade ago, *C. pneumoniae* is an airborne pathogen causing acute and persistent infections of both the upper and lower respiratory tracts (Pediatr Infect Dis J 16:549, 1997). Infection is usually mild or asymptomatic, but can be severe, especially in the elderly. Most primary infections occur during school age and antibodies are usually not found in children <5 years of age. Among adults the seroprevalence is 40–70%. Reinfections are common, and serum

(continued on page 26)

(continued from page 25)
antibodies do not appear to be protective (Emerg Infect Dis 2:307, 1996).

The association of *C. pneumoniae* with heart disease began in 1988 when Finnish investigators demonstrated an association between the presence of IgG and IgA antibodies to *C. pneumoniae* in patients with a diagnosis of angina pectoris (Lancet ii:983, 1988). Subsequent seroepidemiological studies have supported the existence of a real association between *C. pneumoniae* and coronary heart disease. There are, however, limitations to these data, but higher antibody titers have a more consistent association with coronary heart disease than lower antibody titers.

The most convincing evidence that *C. pneumoniae* is involved in atheromas is by demonstrating its presence directly in the tissue and then by recovery of viable organisms from the pathological tissue (Ann Intern Med 125:979, 1996; J Infect Dis 176:292, 1997). Although the presence of *C. pneumoniae* can be demonstrated in atheromatous tissue, recovery of the organism is rare. This may be because the organism can persist in an uncultivable state. Under certain conditions, chlamydia species can revert to a non-replicating state resulting in persistence (Microbiol Rev 58:686, 1994).

The pathogenic role of *C. pneumoniae* in atherogenesis still remains unclear. One theory is that *C. pneumoniae* infects alveolar macrophages which subsequently enter the circulation and deposit within the arterial wall, possibly at the site of previous endothelial damage (Brit Med J 314:1778, 1997). The organisms would then cause a local vascular infection. Once at this site, the infection may spread to endothelial and smooth cells. The cytokine pathway which is subsequently triggered would provide a milieu for smooth muscle proliferation, resulting in intimal growth and occlusion of the arterial wall. Activation of macrophages may result in further stimulation of cytokines resulting in increased levels of IFN-γ and IL-12. IFN-γ has been shown to inhibit the replicative cycle of *C. pneumoniae*, resulting in the persistence of the organism in a non-replicative state. In addition, activation of the macrophages would result in the accumulation of oxidized low density lipoproteins. This process ultimately would result in foamy macrophages, the hallmark of the atherosclerotic plaque. Interestingly, the T lymphocytes identified within the intima of fatty streaks uniformly respond to heat shock proteins, one of which is expressed by *C. pneumoniae* during its intracellular life cycle (Lancet 341:255, 1993).

The consequence of *C. pneumoniae* uptake by macrophages and the mechanism of damage at the site of coronary arteries remain unknown, but there are several possibilities (Curr Opinion Infect Dis 11:301, 1998). First, the organism simply may reside in the macrophages within the atheroma without causing any deleterious effects. Such an association would be purely coincidental. Second, chronic macrophage infection may contribute to local inflammation and the development of atheromatous plaque. Third, *C. pneumoniae* infection may induce the chronic immune activation mediated by the cytokines that contribute to direct chronic endothelial cell damage or stimulate the synthesis of acute phase proteins, such as fibrinogen and C-reactive protein, which are noted to be increased in coronary heart disease patients. Finally, chronic infection may lead to an enhanced proagulant state with increased risk of coronary thrombosis, which could be mediated by monocyte-derived proagulants, such as tissue factor, circulating immune complexes, or by monocyte derived cytokines.

To examine fully whether *C. pneumoniae* plays an important role in coronary heart disease, antibiotic trials aimed at targeting this organism in patients at risk for myocardial infarction are extremely important. The main studies have used azithromycin or roxithromycin and have reduced the risk of myocardial infarction, although there are several different possibilities for the results. First, both antibiotics through their anti-chlamydial activity, may suppress the reactivation of chronic infection within an atherosclerotic plaque. By eradicating or suppressing the infection, these antibiotics may have helped to stabilize the active plaque lesions in part by dampening inflammation and hypercoagulation. Alternatively, these antibiotics may have acted against other infections, which may be linked to coronary heart disease and cardiovascular risk factors. For example, chronic infection with *Helicobacter pylori* has been hypothesized to play a role in causing ischemic heart disease (Circulation 97:1675, 1998). Finally, the results could be viewed as secondary to an effect unrelated to antimicrobial action. Both antibiotics are known to have anti-inflammatory activity, which could have attenuated persistent inflammation in the plaque leading to a more stable state unrelated to the effect on a microbe.

If specific anti-chlamydial eradication therapy is confirmed as being able to reduce cardiovascular events, it will be likely that patients who have suffered a myocardial infarction and have evidence of *C. pneumoniae* infection will be treated with a regimen consisting of aspirin, beta-blocker, angiotensin-converting enzyme inhibitor, antioxidants, and an antibiotic. Concerns over the misuse of antibiotics and the development of antimicrobial resistance then will become further controversial issues.

Recently, Bennett Lorber asked the question “are all diseases infectious?” and pointed out that a number of diseases not believed to be due to an infectious etiology many years ago, most notably peptic ulcer disease, have now been shown to be due to a microbial agent (Ann Intern Med 125:844, 1997). It remains an open question whether atherosclerosis is attributable to *C. pneumoniae*.

(continued from page 6)
optimal HIV prevention effort can be instituted. These issues include limited staff time, lack of training for staff, and the perception that the patient population to which care is provided is at low risk for HIV infection. The response to these issues must include:

- Helping providers develop methods to provide effective HIV risk assessment, education and counseling to their patients in a time- and resource-efficient manner.
- Providing convenient opportunities for education and training of physicians, nurses and other medical staff.
- Helping providers understand that any practice setting can include patients at risk for HIV infection, and that this risk may not be recognized by either the provider or the patient.

REFERENCES:

1. Connor EM, Sperling RS, Gelber R, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. N Engl J Med 1994;331:1173–80. **http://www. nejm.org/content/1994/0331/0018/1173.asp**
2. CDC. Public Health Service task force recommendations for the use of antiretroviral drugs in pregnant women infected with HIV-1 for maternal health and for reducing perinatal HIV-1 transmission in the United States. MMWR 1998;47(No. RR-2). **http://www.cdc.gov/epo/mmwr/mmwr_rr.html**
3. Dillman, DA, Mail and Telephone Surveys: The Total Design Method, (New York: John Wiley, 1978).
4. US Public Health Service. Recommendations for use of antiretroviral drugs during pregnancy for maternal health and reduction of perinatal transmission of human immunodeficiency virus type 1 in the United States 1997. (Current [as of October 1998] CDC recommendations on the use of antiretroviral drugs in HIV-infected pregnant women are published in MMWR 1998;47[No. RR-2].) **http://www.cdc.gov/epo/mmwr/mmwr_rr.html**
5. CDC. US Public Health Service recommendations for human immunodeficiency virus counseling and voluntary testing for pregnant women. MMWR 1995;44(No. RR-7). **http://www.cdc.gov/epo/mmwr/preview/ind95_rr.html**
6. Joint Statement of the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists. Testing for HIV; February, 1997. **http://www.aap. org/policy/rex036.html**
7. Council on Scientific Affairs. Maternal HIV screening and treatment to reduce the risk of perinatal HIV transmission: an update report. American Medical Association Council on Scientific Affairs Report 6-A-95 1995. **http://www.ama-assn.org/med-sci/csa/1995/rpt5a95.htm**
8. Missouri Department of Health. Missouri Department of Health Policy to reduce the risk of perinatal HIV transmission in Missouri. Missouri Epidemiologist 1996; 18(2):1–3. **http://www.health. state.mo.us/MoEpi/MoEpi.html**
9. Missouri Perinatal Association. Missouri Perinatal Association urges perinatal health providers to follow new guidelines for HIV counseling and testing of all pregnant women. Missouri Epidemiologist 1996:18(2):3. **http://www.health.state.mo.us/MoEpi/MoEpi.html**
10. CDC. Recommendations of the US Public Health Service Task Force on the use of zidovudine to reduce perinatal transmission of human immunodeficiency virus. MMWR 1994;43(No. RR-11). **http://www.cdc.gov/epo/mmwr/preview/ind94_rr.html**

Perinatal HIV and AIDS Cases in Missouri

- √ 34 perinatal* HIV cases** and 41 perinatal AIDS cases have been reported to the Missouri Department of Health through December 31, 1997.
- √ During 1997, 2 perinatal HIV cases and 2 perinatal AIDS cases were reported.
- √ 52.9% of perinatal HIV cases and 61.0% of perinatal AIDS cases were in African Americans; the remainder were in whites.
- √ Of reported perinatal HIV cases, 11.8% were from St. Louis City, 17.6% were from St. Louis County, 20.6% were from Kansas City, and 50.0% were from Outstate Missouri.
- √ Of reported perinatal AIDS cases, 29.3% were from St. Louis City, 22.0% were from St. Louis County, 17.1% were from Kansas City, and 31.7% were from Outstate Missouri.
- √ 55.9% of perinatal HIV cases and 65.9% of perinatal AIDS cases were related to injecting drug use (i.e., the mother was either an injecting drug user or had sex with an injecting drug user.)

* Perinatal cases are the result of HIV transmission from an infected mother to her infant before or at the time of birth.

** HIV cases are persons infected with HIV whose disease has not progressed to the point that they meet the AIDS case definition.

Pregnancy-Related Mortality in Missouri: 1990–1997

H. Denny Donnell, Jr., M.D., M.P.H.
Angela Kramer
Office of Epidemiology

Michael Kremer, M.D., M.P.H.
Office of Strategic Planning and Systems Integration

Wayne Schramm, M.A.
Bureau of Health Data Analysis

Introduction

The *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* for the United States listed maternal mortality as a priority area for improvement, including specific goals of no more than 3.3 maternal deaths per 100,000 live births overall, and no more than 5.0 maternal deaths per 100,000 live births among black women.[1] The 1990–1997 Missouri maternal mortality rate was 14.3 deaths per 100,000 live births. The pregnancy-related mortality ratio for black women is over three times higher than for white women in Missouri. This study was conducted to understand the factors associated with the high maternal mortality ratios in Missouri.

Methods

A death was considered to be a potential pregnancy-related death if

- the pregnancy check box, indicating that the woman had been pregnant within 90 days of death, was marked on the death certificate;
- the death certificate otherwise indicated that the woman was pregnant at the time of death;
- the death certificate was matched with a birth certificate or fetal death record for a delivery that occurred within one year before the woman's death; or
- the cause of death was described on the certificate by a key word indicative of pregnancy.

A death was classified as pregnancy-related if it resulted from

- complications of pregnancy,
- a chain of events initiated by pregnancy, or
- aggravation of an unrelated condition by the physiologic or pharmacological effects of pregnancy.[2]

We excluded deaths associated with neoplasms (exclusive of molar pregnancy) and deaths due to trauma because of the difficulty of determining the relationship of pregnancy in these cases.

Several of the variables on the death certificates were examined including the immediate and underlying causes of death, any associated obstetrical conditions or complications, and the outcome of the pregnancy. Information was obtained from death certificates (including notes written in the margins), autopsy reports, medical records, matched birth and fetal death certificates and contact with the physician of record, medical examiner or coroner in certain ambiguous cases.

Live birth and fetal death certificates were available for most women who delivered a live-born or stillborn infant. These certificates provided information on items such as live birth order and prenatal care status that was not available on the maternal death certificates. Equivalent sources of data were not available for women who had an induced or spontaneous abortion, ectopic pregnancy, or who died without delivery of a live-born or stillborn infant.

Inadequate prenatal care was defined as fewer than five prenatal visits for pregnancies less than 37 weeks, fewer than eight visits for those 37 weeks or longer, or care beginning after the first four months of pregnancy. We determined Medicaid status from information on the birth or fetal death certificates, the only source we had available for this information for all of the years from 1990–1997.

Pregnancy-related mortality ratios (PRMRs) were calculated as deaths per 100,000 live births.

Results

A total of 246 potential pregnancy-related deaths were found for the years 1990–1997 using the framework described above. We excluded 156 deaths including 24 due to various

Table 1. Number Live Births, Number of Pregnancy-Related Deaths and Pregnancy-Related Mortality Ratio (PRMR)* by Year of Death, Missouri, 1990–1997

Year of Death	Number of Live Births	Number of Deaths	PRMR
1990	79,135	9	11.4
1991	78,468	9	11.5
1992	76,005	11	14.5
1993	75,146	7	9.3
1994	73,279	13	17.7
1995	72,804	13	17.9
1996	73,733	15	20.3
1997	73,940	9	12.2
Total	**602,510**	**86**	**14.3**

*Pregnancy-related deaths per 100,000 live births

Table 2. Number of Pregnancy-Related Deaths, Pregnancy-Related Mortality Ratio (PRMR)* and Risk Ratio by Race, Missouri, 1990–1997

Race	Number of Deaths	PRMR	Risk Ratio	95% CI†
White	50	10.1	Referent	
Black	34	34.6	3.4	(2.28–4.58)
Other	2	20.0	2.0	(0.00–4.73)
Total	**86**	**14.3**		

*Pregnancy-related deaths per 100,000 live births
†Confidence interval

Table 3. Number of Pregnancy-Related Deaths, Pregnancy-Related Mortality Ratio (PRMR)* and Risk Ratio by Age, Missouri, 1990–1997

Age Group	Number of Deaths	PRMR	Risk Ratio	95% CI†
<20	10	11.6	1.0	(0.37–1.56)
20–29	40	11.9	Referent	
30–34	20	16.0	1.3	(0.75–1.93)
≥35	16	29.9	2.5	(1.28–3.74)
Total	**86**	**14.3**		

*Pregnancy-related deaths per 100,000 live births
†Confidence interval

neoplasms because the cause of death did not appear to be related to pregnancy. We excluded four additional deaths with an uncertain relation to pregnancy. The remaining 86 deaths were used as the basis of this analysis. Birth certificates were available for 44 (96%) of 46 maternal deaths associated with live births. Matched fetal death certificates were available for 8 (80%) of 10 maternal deaths associated with stillbirth (fetal deaths >20 weeks gestation). There were 30 pregnancy-related maternal deaths that were not associated with either a live or still birth.

The overall pregnancy-related mortality ratio for the eight-year surveillance period was 14.3 deaths per 100,000 live births. While there appears to be an upward trend in the number of cases year by year as shown in Table 1, the annual number of pregnancy-related deaths in Missouri did not vary significantly over time ($p = 0.22$ using the Poisson regression), ranging from seven to 15 deaths per year.

Black women were 3.4 times more likely to die from pregnancy-related causes than were white women. See Table 2. Age was also associated with pregnancy-related mortality, particularly for women aged 35 years and older, who had a 2.5 times higher risk for death than women aged 20–29 years. See Table 3.

The most common pregnancy outcome associated with a pregnancy-related death was a live birth (54%), followed by an undelivered pregnancy (15%), a stillbirth (12%), a spontaneous abortion (6%), an ectopic pregnancy (5%) and an induced abortion (5%).

The overall risk for pregnancy-related death among unmarried women was twice as great as that for married women. The PRMR was 21.5 deaths per 100,000 live births for all unmarried women and 10.9 for all married women. The age-adjusted PRMR for unmarried white women was 2.1 times greater than that for married white women, whereas this same ratio for unmarried black women was one half of that for married black women.

Of all the women who died following a live birth in which adequacy of prenatal care was known, four (10%) had received no prenatal care and 10 (25%) had inadequate prenatal care. The risk of pregnancy-related death was 8.6 times higher for women who received no prenatal care than for women who received adequate care and 2.0 times greater for those who received inadequate prenatal care.

The risk for pregnancy-related death increased with increasing live-birth order, beginning with women delivering their first live-born infant, for all women whose pregnancies resulted in a live birth. The PRMR was 1.6 times higher for women following delivery of a third or higher-order live-born infant than for women following a first live birth (10.2 vs. 6.5).

Hemorrhage was the underlying cause of death for 17 (20%) women, regardless of pregnancy outcome. Fifteen (17%) women died from a pulmonary embolism, and infection was the cause of death for 14 (16%) women. Pregnancy-induced hypertension complications were the underlying cause of death for 12 (14%) women. Eleven (13%) women died from cardiovascular complications and three (4%) from anesthesia complications. Fourteen (16%) died from other causes.

There were 40 pregnancy-related deaths in the St. Louis region (including only St. Louis City and St. Louis County) compared to 46 in the rest of the state. The PRMR for the region was 24.0 compared to 10.6 for the rest of the state. See Table 4 on page 30. Thus, women residing in the St. Louis region had a 2.3 times greater risk for pregnancy-related death than women from the rest of the state. The risk for pregnancy-related death in the St. Louis region among resident black women was 4.7 times greater than that for resident white women. In comparison

(continued on page 30)

(continued from page 29)
with black women from the rest of the state, black women of the St. Louis region had 3.4 times the risk for pregnancy-related death, whereas the risk for pregnancy-related death among white women of the St. Louis region was approximately the same as that for white women from the rest of the state.

PRMRs were elevated for black women in the St. Louis region throughout the study period.

Medicaid status was known for 52 (60%) of pregnancy-related deaths. The PRMR for women on Medicaid was 10.8 compared with 8.0 for women not on Medicaid. This 35 percent differential primarily reflected white differentials which were 8.4 for Medicaid compared to 5.9 for non-Medicaid. Black women not on Medicaid had a PRMR approximately double those of black women on Medicaid: 30.4 versus 15.0 respectively. Among the 38 women delivering a live-born infant in which adequacy of prenatal care was known, nine (43%) Medicaid participants received no or inadequate prenatal care compared with one (6%) for non-Medicaid participants.

The risk for pregnancy-related death was analyzed with respect to hospital obstetric level for all women who delivered a live-born or stillborn infant. The PRMRs were significantly higher for hospitals which provided level 3, the highest level of obstetric services. The PRMR for level 1 was 6.1, for level 2 it was 5.3 and it was 10.3 for level 3 hospitals.

Discussion

Readers familiar with Missouri official vital statistics may note that the number of pregnancy-related deaths described here exceeds by 48 percent the 58 maternal deaths included in the published reports for 1990–1997. In this analysis, a number of additional deaths were found which could be included under the currently prevailing criteria specifying "a chain of events that was initiated by the pregnancy" or "the aggravation of an unrelated condition by the physiologic or pharmacological effects of the pregnancy." These additional deaths were included as maternal deaths based on the more recent medical literature which has established these criteria. Exclusion of deaths due to trauma gives a sharper focus on the more obvious causes of pregnancy-related mortality but may obscure other relationships such as the reported increase in self-inflicted trauma among postpartum women.[3]

Berg et al.[4] in 1996 wrote that "increased efforts to identify pregnancy-related deaths have contributed to an increase in pregnancy-related mortality" but that "more than half of such deaths...are probably still unreported." Sachs et al.[3], reporting on maternal deaths in Massachusetts from 1976–1985, found that 43 percent were determined to be preventable by a maternal death review committee. It is uncertain how the current definitions of pregnancy-related deaths would have affected this percentage.

Since relatively high St. Louis black PRMRs occurred throughout the surveillance period of 1990–1997, it is unlikely that recent changes in the health care system, such as the implementation of Medicaid Managed Care in late 1995 or the closing of the St. Louis Regional Medical Center in late 1996, were the primary cause of the high St. Louis ratios.

It is not unexpected that the larger hospitals with level 3 obstetric status had higher PRMRs since they provide care for the most difficult and complicated patients.

Public Health Measures

Increased efforts should be made to assure that pregnant women receive prenatal care early in the course of pregnancy. Providers caring for pregnant black women should be mindful of the increased risk of death even for those women who are married. Providers caring for pregnant women aged at least 35 years or those women following delivery of a third or higher-order live-born infant should also be aware of the increased risk of death.

Prenatal and perinatal care should focus on prevention of hemorrhage, pulmonary embolism, infection, pregnancy-induced hypertension, and cardiovascular and anesthesia complications. These conditions are not necessarily preventable in the sense of avoiding the condition altogether. Early detection and skilled management of these complications is essential, i.e. the condition

Table 4. Number of Pregnancy-Related Deaths and Pregnancy-Related Mortality Ratio (PRMR)* by Select Resident Counties and Race, Missouri, 1990–1997

	White			Black			All Races		
Resident County	**No.**	**PRMR**	**95% CI†**	**No.**	**PRMR**	**95% CI**	**No.**	**PRMR**	**95% CI**
St. Louis City	0	0.0	0.0	20	54.3	(30.48–78.03)	20	35.6	(20.02–51.25)
St. Louis	10	12.1	(4.59–19.54)	9	35.7	(12.38–59.03)	20	18.0	(10.14–25.95)
Total	**10**	**9.9**	**(3.76–16.03)**	**29**	**46.7**	**(29.72–63.73)**	**40**	**24.0**	**(16.54–31.38)**
Rest of State**	40	10.2	(7.04–13.37)	5	13.8	(1.71–25.98)	46	10.6	(7.51–13.61)

*Pregnancy-related deaths per 100,000 live births
†Confidence interval
**Excludes St. Louis City and St. Louis County

may not be prevented, but death due to the condition would ideally be avoided through appropriate secondary and tertiary prevention. Secondary prevention may include referral to a high risk obstetrician or perinatal subspecialist while tertiary prevention may include not only referral to specialists, but also emergency treatment and transport to tertiary obstetrical centers. Consultation with management of these complications and referral of high-risk women should be strongly considered.

The excess of pregnancy-related deaths in Missouri over the goals set by the Healthy People 2000 objectives may be due to potentially preventable conditions such as pregnancy-induced hypertension and infections. Some complications during or shortly after pregnancy may be unanticipated, even in otherwise healthy women receiving exemplary care. Some complications, however, may be due to substance abuse or worsening of existing precarious medical conditions as a consequence of unintended pregnancy. Some complications may arise, or be poorly managed, by virtue of lack of competent obstetrical services due to problems with access to care or due to personal choice. There may be nothing which can be done for some unanticipated rare events. However, substance abuse, unintended pregnancy and availability and quality of services are important public health concerns.

We propose convening an expert group to review each maternal death in a timely manner to assist in the discovery of preventable causes of maternal mortality.[3] Such a group should include obstetricians and perinatologists with expertise in management of high risk pregnancy along with public health experts in maternal health and in epidemiology. It should include representatives from all the academic obstetric centers in the state. Review of each maternal death by such a group could help to classify the deaths as to their relation to pregnancy and to determine the types of deaths that could have been prevented. Review of outpatient and inpatient records could determine whether lapses in quality of care may have been responsible for some deaths. Such information would be valuable in setting priorities and giving guidance to programs for continuing obstetrical education and to other programs to improve care and prevent maternal deaths. It would be desirable to have such a group empowered with legislative authority.

As more is learned about medical prevention of premature birth, the quality of prenatal care will achieve paramount importance as opposed to the present focus on surrogate measures of timing and quantity of prenatal visits. Understanding the problems in the health care system that may contribute to pregnancy-related mortality may aid our understanding of the problems with quality of prenatal care.

Conclusion

During 1990–1997, 86 Missouri deaths were determined to be pregnancy-related. The overall PRMR was 14.3 deaths per 100,000 live births, yet there were no statistically significant trends in the annual rates during these years. The PRMR for black women was consistently higher than that for white women for almost every factor examined by race. Older women, particularly women aged 35 years and older, were at increased risk for pregnancy-related deaths. The overall risk for pregnancy-related death among unmarried women was twice as great as that for married women. The risk for pregnancy-related death was 8.6 times higher for women who received no care than for women who received adequate prenatal care. Overall, resident women of the St. Louis region had 2.3 times the risk of pregnancy-related death compared to women from the rest of the state.

Major changes must be made in the care provided to pregnant women if changes are to occur in maternal mortality and in order to reach the desirable goals for the year 2000. Review of individual maternal deaths by an expert group is proposed as a means to this end.

REFERENCES:

1. US Department of Health and Human Services. Healthy People 2000: National health promotion and disease prevention objectives. Washington: PHS. 1990.
2. Koonin LM, MacKay AP, Berg CJ, Atrash HK, Smith JC. Pregnancy-related Mortality Surveillance—United States, 1987-1990. MMWR Surveillance Summaries 1997;46 (SS-4):17-36.
3. Sachs BP, Brown DAJ, Driscoll SG et al. Maternal Mortality in Massachusetts. NEJM 1987;316: 667-72.
4. Berg CJ, Atrash HK, Koonin LM, Tucker M. Pregnancy-Related Mortality in the United States, 1987-1990. Obstetrics and Gynecology 1996;88: 161-67.

Disease Reporting

Cases of reportable diseases and conditions should be reported promptly to your local health department, or to the Missouri Department of Health at

(800) 392-0272
(during working hours)
or
(573) 751-4674
(after hours, weekends or holidays)

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
P.O. Box 570
Jefferson City, MO 65102-0570
www.health.state.mo.us

The *Missouri Epidemiologist* is a regularly scheduled bimonthly newsletter published jointly by the Office of Epidemiology, Center for Health Information Management and Epidemiology (CHIME) and the Division of Environmental Health and Communicable Disease Prevention (EHCDP). CHIME's responsibilities include managing health statistical systems, epidemiological functions and information systems of the department. EHCDP's responsibilities include the prevention and control of communicable diseases and environmentally induced illnesses, including the requisite epidemiological investigations.

The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272.

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Office of Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

LATE BREAKERS

☞ The Department of Health has finalized its integrated strategic plan for 1998. The plan contains goals, objectives and strategies focused on the following four areas of interest to public health in Missouri:

- Protecting the Health of Missouri's Children
- Preventing or Controlling Communicable Diseases
- Reducing the Burden of Chronic Diseases
- Safeguarding the Public

You can obtain a copy of the strategic plan by contacting Barb Wilbers, Governmental Policy and Legislation at (573) 751-6003. The strategic plan will also be made available through the Department of Health Home Page at http://www.health.state.mo.us.

☞ F. T. Satalowich, D.V.M., M.S.P.H., Chief, Bureau of Veterinary Public Health, retired from the Department of Health on October 31, 1998. Dr. Satalowich served as State Public Health Veterinarian for the past 17 years. His consultation and efforts to prevent the spread of zoonotic diseases will be missed.

☞ In October, Kurt M. Kleier was promoted to Assistant Chief of the Office of Surveillance in the Division of Environmental Health and Communicable Disease Prevention. Since December 1996, Kleier has managed the statewide STD/HIV Surveillance Program. He will retain these duties in addition to assisting with administrative functions.

☞ The Missouri Department of Health is proposing to amend the following rules:

19 CSR 20-20.020 Reporting Communicable, Environmental and Occupational Diseases
19 CSR 20-20.080 Duties of Laboratories
19 CSR 20-26.030 HIV Antibody Test Consultation and Reporting
19 CSR 20-26.040 Physician HIV Antibody Test Consultation and Reporting
19 CSR 20-26.070 Notification of Results of Court-Ordered HIV Testing of Sexual Offenders

Individuals who wish to obtain details and/or provide comments regarding the proposed amendments should contact Dr. Howard Pue in the Office of Surveillance at Ph: (573) 526-5324, Fax: (573) 522-8032 or E-mail: pueh@mail.health.state.mo.us.

Missouri EPIDEMIOLOGIST

Volume 20, Number 6 *November-December 1998*

Maternal Smoking Trends in Missouri: 1978–1997

Craig Ward
Bureau of Health Data Analysis

Smoking during pregnancy is associated with reduced birth weight, increased fetal and infant morbidity, and other adverse pregnancy outcomes. Since the behavior is prevalent and these outcomes are considered to be preventable, trends in maternal smoking are of great interest to public health. This article examines three aspects of trends in smoking among pregnant Missouri resident women:

- Changes in the rate of prenatal smoking by race and age of mother for the period 1978–1997;
- Changes in the smoking rates of the prenatal population by selected characteristics for 1992–1994 and 1995–1997; and
- Changes in the smoking rates of the prenatal population by selected characteristics that smoked one pack of cigarettes or more per day for 1992–1994 and 1995–1997.

Data for this analysis comes from Missouri birth certificates for 1978–1997. The data set has smoking information on 98 percent of 1.5 million live births. Records with unknown smoking status are included in the study since they only comprise two percent of the total records. Of the records with unknown smoking status, 79 percent are resident births recorded in states other than Missouri. The smoking criterion on Missouri birth certificates for 1978–1988 was defined as "cigarettes smoked per day" with possible responses of "none," "less than a pack per day," and "a pack or greater per day." The criterion was revised in 1989 to conform to the United States standard birth certificate, which asks whether tobacco was used during pregnancy and how many cigarettes were smoked each day on average. Mothers were categorized as smokers or non-smokers regardless of the number of cigarettes smoked. Those who smoked one pack (20 cigarettes) or more per day were classified as heavy smokers. Data for the total population includes all races.

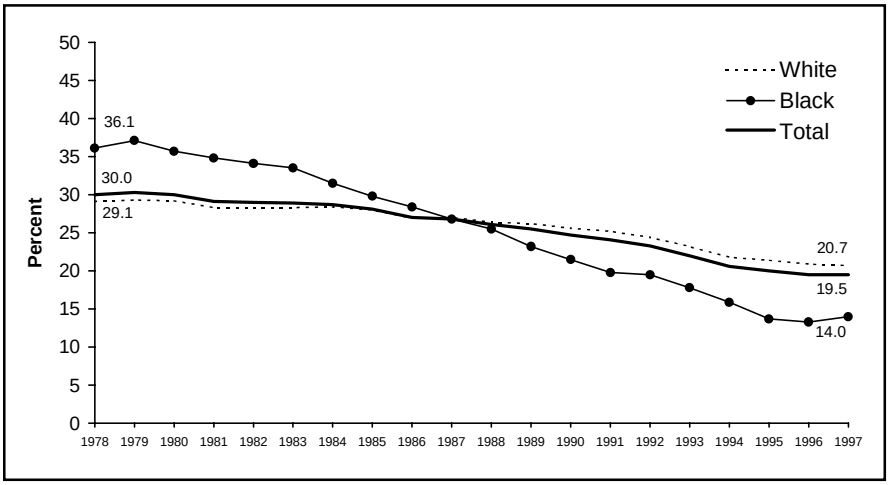


Figure 1. Percentage of women smoking during pregnancy by race, Missouri resident births, 1978–1997.

The number and percent of women smoking during pregnancy was much lower in 1997 (14,409, 19.5%) than it was in 1978 (21,803, 30.0%). Figure 1 shows changes in the percent of maternal smoking by race and for the total population for 1978–1997. Given that the majority of women in Missouri are white, the trend line for all women is very similar to the white trend line. It is notable that the black rate of maternal smoking began above the white rate and ended below it, decreasing 61.2 percent over the 20 year period. By comparison, the white and total rates only decreased 28.9 and 35 percent respectively. However, in 1997 the black smoking rate rose for the first time since 1979, while the white rate continued to decline.

(continued on page 2)

Inside this Issue...

(continued from page 1)

Figure 2 shows the percent of white women smoking during pregnancy by age group for the study period. During this time the rate for each age group sloped downward slightly. Among white women, teens had the highest rate of smoking over the entire 20 years, with the rate decreasing by age for all but the first three years. Among women under the age of 30, both the number and percent smoking during pregnancy decreased over 20 years. For white women age 30 and over, the percent smoking dropped but the actual number of women smoking increased. The number and percent of smoking teen and 20–24 year old mothers began to increase near the end of the period (1995 and 1996 respectively) after decreasing for most of the years.

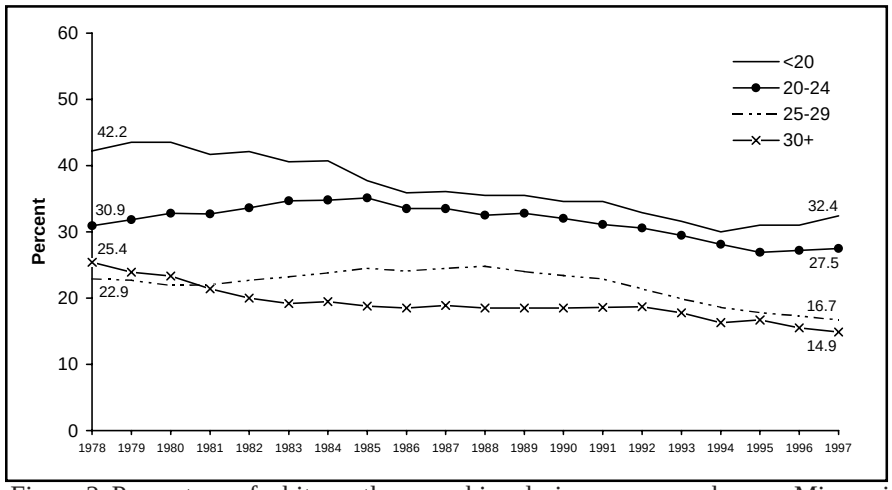


Figure 2. Percentage of white mothers smoking during pregnancy by age, Missouri resident births, 1978–1997.

Figure 3 shows the rates for black teens had the greatest change of any age group of either race, decreasing 76 percent from 1978–1997. The percent of maternal smoking dropped for all black age groups, yet the decrease among women age 30 and over was smaller than the other groups. In 1978, the percent of smokers 30 and over was the lowest among black women. By 1997, this group had the highest rate. Although the percent decreased, the number of black women age 30 and over that smoked actually increased.

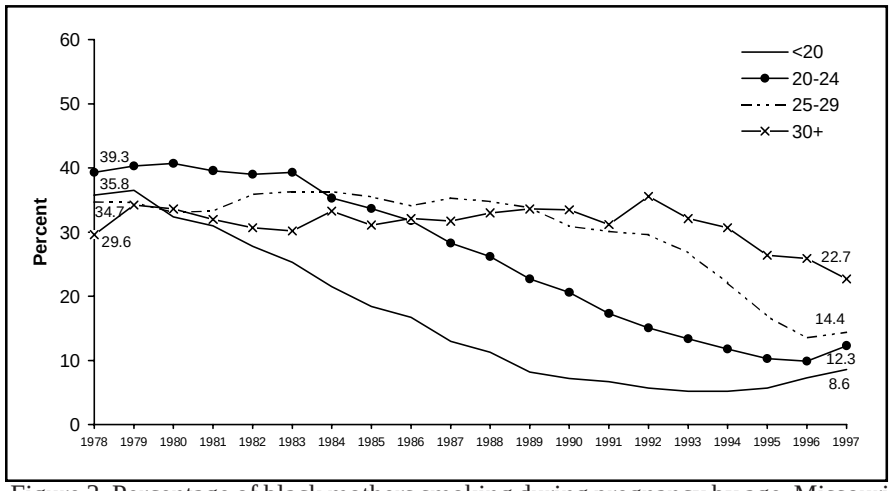


Figure 3. Percentage of black mothers smoking during pregnancy by age, Missouri resident births, 1978–97.

An article published in the May 1991 issue of *Missouri Monthly Vital Statistics* examined characteristics of women who smoked during pregnancy and of those who smoked heavily (a pack or more per day) for the years 1978–1980 and 1986–1988. Three years of data were used to reduce the random fluctuation of small numbers that were present in some areas. Since there has been a change in the long-term smoking rates by race and age in recent years, this article uses a similar approach to compare these characteristics for the years 1992–1994 and 1995–1997.

Table 1 shows that the percentage of all women who smoked during pregnancy dropped 10.5 percent from 1992–1994 to 1995–1997. Among all characteristics reviewed, the greatest decreases for the total population, in descending order, were among women not on Medicaid (19.9%), women ages 25–29 (18.4%), married women (16.8%), women with at least 16 years of education (16.3%), and women living in Metropolitan Statistical Areas* (15.1%). In almost all cases, black rates were lower than white rates. The exceptions are among women age 30 and over, women having 16 or more years of education, and women having their fourth or greater birth. In each case the difference became smaller by 1995–1997.

The only area in which an increase in smoking occurred was among teens, where both the number and percent increased. While no percent change for white teen mothers is shown in Table 1, both the number of live births and the number smoking increased for this segment of the population. The particular grouping of years for this study masks what is shown in Figure 2. The percent

*A metropolitan statistical area consists of a central city of 50,000 population or more, and the county in which it is located; it may also include adjacent counties/communities that have a high degree of economic and social interaction with the center-city area. Missouri has six metropolitan statistical areas: Columbia/Boone county; Joplin/Jasper and Newton counties; Kansas City/Cass, Clay, Clinton, Jackson, Lafayette, Platte and Ray counties; St. Joseph/Andrew and Buchanan counties; St. Louis/Franklin, Jefferson, Lincoln, St. Charles, St. Louis and Warren counties; and Springfield/Christian, Greene and Webster counties.

Table 1. Percentage of Women Who Smoked During Pregnancy by Selected Characteristics by Race, Missouri Resident Births, 1992–1994 and 1995–1997

Category	1992–1994 Percent Smoking			1995–1997 Percent Smoking			Percent Change		
	Total	White	Black	Total	White	Black	Total	White	Black
Mother's Age									
Less than 20	23.3	31.5	5.4	24.7	31.5	7.2	6.0	0.0	33.3
20–24	26.0	29.4	13.5	24.0	27.2	10.9	-7.7	-7.5	-19.3
25–29	20.6	20.0	26.4	16.8	17.3	15.0	-18.4	-13.5	-43.2
30+	19.0	17.6	32.8	16.4	15.7	25.0	-13.7	-10.8	-23.8
Education (Years)									
Less than 12	40.2	48.0	21.7	38.6	45.5	19.0	-4.0	-5.2	-12.4
12	25.4	27.1	18.4	23.7	25.9	13.9	-6.7	-4.4	-24.5
13-15	15.5	16.2	12.5	14.1	15.1	8.8	-9.0	-6.8	-29.6
16 or more	4.3	4.2	7.1	3.6	3.6	3.9	-16.3	-14.3	-45.1
Birth Order									
First	17.4	19.6	7.0	16.3	18.1	6.6	-6.3	-7.7	-5.7
Second or Third	23.4	24.6	18.0	20.6	22.0	13.1	-12.0	-10.6	-27.2
Fourth or more	33.5	31.9	37.6	29.4	29.1	30.7	-12.2	-8.8	-18.4
Married	16.7	17.2	11.7	13.9	14.4	7.7	-16.8	-16.3	-34.2
Unmarried	33.2	43.5	19.4	31.6	41.2	15.3	-4.8	-5.3	-21.1
Medicaid	33.9	40.6	19.6	32.0	38.2	15.6	-5.6	-5.9	-20.4
Non Medicaid	14.1	14.3	13.6	11.3	11.6	9.5	-19.9	-18.9	-30.1
MSA*	20.5	21.6	18.0	17.4	18.7	13.6	-15.1	-13.4	-24.4
Non-MSA*	25.7	26.3	15.5	25.0	25.6	14.3	-2.7	-2.7	-7.7
TOTAL	**22.0**	**23.2**	**17.8**	**19.7**	**21.0**	**13.7**	**-10.5**	**-9.5**	**-23.0**
Number	224,430	182,485	37,972	220,477	182,502	33,060			

*MSA = Metropolitan Statistical Areas

of white teens smoking while pregnant declined during 1992–1994, then changed direction and nearly returned to the 1992 level during 1995–1997. Among black teen mothers, the rate increased 33.3 percent, as the number of live births to black teens dropped and the number of smokers rose. The increase in smoking among all pregnant teens made them the age group with the highest smoking rate.

Smoking characteristics identified in the May 1991 article for marital status, education and birth order held for this study as well. Specific rates in all categories declined, and black rates continued to be smaller than white rates in most cases. The percentage of unmarried women smoking during pregnancy continued to be higher than for married women. Rates of smoking continued to be higher for women without a high school education and continued to decrease as years of education increased. The percentage smoking was lower for first births than for subsequent births, with the fourth or higher order birth having the highest rate. In addition, women receiving Medicaid had a higher percentage of smoking than women not on Medicaid. Each of these characteristics held for all women, regardless of race.

For 1995–1997, a higher percentage of mothers who lived in rural areas smoked than those living in Metropolitan Statistical Areas, regardless of race. The opposite had been true among black women for 1992–1994.

Heavy smoking during pregnancy (i.e., one pack or more per day) decreased 20.8 percent among all women from 1992–1994 to 1995–1997. (Not shown in figures or table.) The percentage of heavy smokers declined for each characteristic, continuing the decreases reported in the May 1991 article. The greatest decreases from 1992–1994 to 1995–1997, in descending order, were for non-Medicaid women (30.2%), married women (28.1%), women aged 25–29 (26.8%), women living in a Metropolitan Statistical Area (25%), women with 16 or more years of education (22.2%), and women having their second or third birth (20.5%). In every case, the rate of heavy smoking among white women was higher than the rate among black women (6.5% vs. 2.1%, overall respectively in 1995–1997).

For black and white women, the characteristics of heavy smokers are the same except for age, where they are

(continued on page 4)

(continued from page 3)
reversed. Heavy prenatal smokers are more likely to be unmarried, have less than a high school education, have had at least one previous live birth, receive Medicaid and live in a rural area. Among black women, heavy smokers are more likely to be 30 or older; among white women they are younger, age 20–24. For the total population, most women who smoke heavily during pregnancy are white.

It is evident that smoking during pregnancy has declined over several years. This decline has been shown to be consistent over several characteristics. It is also evident that maternal smoking has recently begun to increase among young women. When this portion of the population is examined by race, two different pictures emerge.

Although the percent of prenatal smoking among white teens declined between 1978–1997, this group maintained the highest rate of smoking among white women over that same period. Those in the 20–24 year age group maintained the second highest rate. This occurred at a time when percentages among women over age 24, and among all black age groups, fell at higher rates. The white teen rate never went below 30 percent and has increased since 1994 to 32.4 percent in 1997.

Among black women, the percent of teens that smoked during pregnancy dropped 76 percent over this period. It went from being the second highest rate to the lowest rate among black women. Yet the black teen rate has increased every year since 1994 (5.2% to 8.6% in 1997). When the data was grouped in three year clusters, the black teen rate was the only rate among any age group, category or race to show an increase in smoking. Even with this increase the number of white teens smoking during pregnancy is over 10 times that associated with black teens (2,397 vs. 231 respectively for 1997).

As with Missouri, national birth certificate data (minus California, Indiana, New York State and South Dakota) shows an overall decrease for mothers smoking during pregnancy and an increase for pregnant teenagers. However, for 1996 (the most recent national data available) the percent of Missouri mothers who smoked during pregnancy was 44 percent above the national rate of 13.6 percent and only four states recorded higher rates than Missouri.[1]

If women who smoke during pregnancy are representative of the general population, then increasing rates for teens will mean increasing rates for all groups as the cohort ages. Smoking rates among the characteristics reviewed will also go up as young mothers have more children and older women have their first child. These results emphasize the need for more and better smoking avoidance programs targeted at young women. Further exploration of social and economic factors influencing smoking behavior is also indicated.

(continued on page 30)

TIPS ON QUITTING SMOKING

Health professionals can play a substantial role in helping their patients quit smoking. At least 70% of smokers see a physician each year, and more than 50% see a dentist. Additionally, at least 70% of smokers want to quit and have already made at least one quit attempt. By spending just a few minutes, providers can be more effective in their cessation interventions.

- ✔ Implement an office-wide system that identifies all tobacco users at every visit, such as by expanding the vital signs to include tobacco use.
- ✔ Give direct, clear and personalized advice about quitting smoking and staying smoke-free.
- ✔ Assist the patient by helping them set a quit date and give key advice on improving success (such as by being totally tobacco abstinent after the quit date, destroying cigarettes, and planning on how to handle potential relapse challenges). Help your patient understand that quitting smoking is hard and that people can make two to three tries, or more, before finally being able to quit.
- ✔ Encourage nicotine replacement therapy, as appropriate.
- ✔ Provide cessation materials and schedule follow-up, especially during the first week of quitting.
- ✔ Show genuine concern about the patient's health and their quitting efforts.
- ✔ If the patient is not successful, provide support and assistance for quitting again.

For more information on smoking cessation and to obtain free copies of *Clinical Practice Guidelines on Smoking Cessation*, contact the **Agency for Health Care Policy and Research Clearinghouse, P.O. Box 8547, Silver Spring, MD 20907** or on-line at **http://www.ahcpr.gov.**

For additional information on tobacco-related issues or Baby and Me Smoke Free intervention materials for pregnant women contact the **Missouri Department of Health ASSIST program at (573) 876-3256** or on-line at **http://www.health.state.mo.us/SmokingAndTobacco.**

STD Clinician Course

March 18–April 22, 1999

This course, an intensive overview of STDs, includes 18 hours of lecture, 2 hours of case discussion and 24 hours of supervised clinical practicum in the St. Louis STD clinics.

COURSE OBJECTIVES

At the end of this course, participants will be able to:

- Demonstrate improved skills in completing a STD history and physical exam.
- Integrate HIV risk assessment into patient care.
- Describe clinical features of common STDs, including gonorrhea chlamydia, genital herpes, vaginitis/vaginosis, syphilis, HPV, urethritis/cervicitis syndromes, pediculosis, scabies and PID.
- Demonstrate universal precautions during specimen collection.
- Describe the process of partner notification and contact tracing.

TARGET AUDIENCE

Health care professionals in public or private settings who provide clinical services to persons with STDs. Physicians, nurse practitioners, and physician assistants will find courses tailored to their level of expertise.

CME ACCREDITATION

The St. Louis STD/HIV Prevention Training Center is accredited by the Missouri State Medical Association to sponsor continuing medical education for physicians. The St. Louis STD/HIV Prevention Training Center designates this continuing education activity as 44 credit hours in Category 1 of the Physician's Recognition Award of the American Medical Association. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

CEU ACCREDITATION

This course has been approved for 52.8 contact hours by the Missouri Nurses Association, which is accredited to approve continuing education in nursing by the American Nurses' Credentialing Center's Commission on Accreditation.

REGISTRATION FEE $90

For registration information contact:

Deloris (Dodie) Rother, MPH
St. Louis STD / HIV Prevention Training Center
Washington University School of Medicine
Ph: (314) 747-0294
email: std/hiv@im.wustl.edu **or**
drother@imgate.wustl.edu

St. Louis STD/HIV Prevention Training Center

http://www.umsl.edu/services/itc/std_ptc.html

Course Schedule & Faculty

Courses will be presented by faculty from Washington University School of Medicine, St. Louis University School of Medicine and community experts. Course instruction is coordinated by Bradley P. Stoner, MD, PhD, Medical Director of the Training Center.

Thursday, March 18, 1999 - 8:00 a.m.–11:30 a.m.

Overview of STDs - SUSAN BERSOFF-MATCHA, MD
History and Physical Exam for STD - SUSAN BERSOFF-MATCHA, MD
Specimen Collection- - JANE FISCHER-MESSMER, RNC, APN

Thursday, March 25, 1999 - 8:00 a.m.–11:30 a.m.

Herpes - SUSAN BERSOFF-MATCHA, MD
Human Papillomavirus - CATHERINE DEAN, MD, MPH
Syphillis - BRADLEY STONER, MD, PhD

Thursday, April 1, 1999 - 8:00 a.m.–11:30 a.m.

Gonorrhea - SHARON FREY, MD
Non-gonococcal Urethritis & Mucopurulent Cervicitis - BRADLEY STONER, MD, PhD
Vaginitis/Vaginosis - SUSAN BERSOFF-MATCHA, MD

Thursday, April 8, 1999 - 8:00 a.m.–11:30 a.m.

Pelvic Inflammatory Disease - ANDREA STEPHENS, MD
Ectoparasitic Infestations - PAUL L'ECUYER, MD
Chancroid and LGV - DANNY PAUL, MD
Hepatitis B - LINDA MUNDY, MD

Thursday, April 15, 1999 - 8:00 a.m.–11:30 a.m.

Assault and Substance Abuse - SHEILA BOYD, MD
Adolescents and STDs - CHRIS OHLEMEYER, MD
STD/HIV Interactions - BRADLEY STONER, MD, PhD

Thursday, April 22, 1998 - 8:00 a.m.–11:30 a.m.

Risk Assessment & Partner Notification - DELORIS ROTHER, MPH
Syndromic Management - BRADLEY STONER, MD, PhD
Case Discussion and Wrap-up - BRADLEY STONER, MD, PhD

Clinical Training

In addition to lectures, students will receive 24 hours of hands-on clinical training with time divided beween the St. Louis County Department of Health and the St. Louis City Department of Health and Hospitals STD clinics. Clinical training will be scheduled after completion of the didactic portion of the course at a convenient time for the students to receive one-on-one training with experts in the field.

Viral Sexually Transmitted Diseases

March 6, 1999 - 9:00 a.m.– 4:00 p.m.

This course is a comprehensive study of the diagnosis, management and treatment of the most common viral STDs, including herpes (HSV), human papillomavirus (HPV), and hepatitis B and C. This course includes 6 hours of lecture, and 8 hours of supervised clinical practicum in St. Louis STD clinics.

COURSE OBJECTIVES

At the end of this course, participants will be able to:

- Discuss current trends of infection with viral STDs, including demographic and behavioral correlates.
- Describe the current diagnosis and treatment recommendations for HSV, HPV, and hepatitis B and C.
- Recognize, differentiate and evaluate clinical manifestations of HSV and HPV infections.
- Interpret the basic laboratory tests used to diagnose viral STDs including serology and culture.
- Discuss methods to provide patient education regarding HSV, HPV and hepatitis.
- Describe the process of partner notification for viral STDs.

TARGET AUDIENCE

Health care professionals in public or private settings who provide clinical services to persons with STDs. Physicians, nurse practitioners and physician assistants will find courses tailored to their level of expertise.

CME ACCREDITATION

The St. Louis STD/HIV Prevention Training Center is accredited by the Missouri State Medical Association to sponsor continuing medical education for physicians. The St. Louis STD/HIV Prevention Training Center designates this continuing medical education activity as 14 credit hours in Category 1 of the Physician's Recognition Award of the American Medical Association. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

CONTINUING EDUCATION

Application for continuing education contact hours has been submitted to the Missouri Nurses Association.

REGISTRATION FEE $40

For registration information contact:

Deloris (Dodie) Rother, MPH
St. Louis STD / HIV Prevention Training Center
Washington University School of Medicine
Ph: (314) 747-0294
email: std/hiv@im.wustl.edu **or**
drother@imgate.wustl.edu

St. Louis STD/HIV Prevention Training Center

http://www.umsl.edu/services/itc/std_ptc.html

Course Schedule

Courses will be presented by faculty from Washington University School of Medicine, St. Louis University School of Medicine and community experts. Course instruction is coordinated by Bradley P. Stoner, MD, PhD, Medical Director of the Training Center.

9:00–9:15 a.m. **Welcome**
DELORIS ROTHER, MPH

9:15–10:15 a.m. **Overview of Viral STDs**
BRADLEY STONER, MD, PhD

10:15 –11:30 a.m. **Herpes**
SUSAN BERSOFF-MATCHA, MD

11:30–12:30 p.m. **LUNCH**

12:30–1:30 p.m. **Human Papillomavirus**
CATHERINE DEAN, MD, MPH

1:30–3:00 p.m. **Hepatitis B**
LINDA MUNDY, MD

3:00–4:00 p.m. **Hepatitis C**
SHARON FREY, MD

Teleconferencing

In conjunction with the Instructional Technology Center at the University of Missouri–St. Louis, the Training Center will provide the didactic portion of this course using fiberoptic teleconferencing technology. Lectures will be two-way audio and visual, allowing for interaction beween faculty and students. Instruction will be provided at various sites across Missouri and Kansas. Course participants will attend the site of instruction closest to them, thereby reducing time away from their offices. After completing the didactic portion, participants will be scheduled for hands-on training in the St. Louis STD clinics at a convenient time.

MISSOURI SITES
Columbia
Kansas City
Poplar Bluff
St. Louis
Springfield

KANSAS SITES
Dodge City
Hays
Lawrence
Salina
Wichita

1998 Guidelines for Treatment of Sexually Transmitted Diseases

(Continued from the January-February, March-April, July-August and September-October 1998 issues of the *Missouri Epidemiologist*)

Physicians and other health-care providers have a critical role in preventing and treating sexually transmitted diseases (STDs). The following recommendations for the treatment of STDs, which were developed by the Centers for Disease Control and Prevention (CDC) in consultation with a group of outside experts, are intended to assist with that effort.

The recommendations, which update those released by CDC in 1993, were reprinted from CDC's *Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports*, Vol. 47, No. RR-1, January 23, 1998. This issue of the *Missouri Epidemiologist* contains the introduction and the sections of the guidelines which relate to clinical prevention guidelines, special populations, vaccine-preventable STDs and sexual assault. Those sections relating to diseases characterized by urethritis and cervicitis were reprinted in the January-February 1998 issue; to diseases characterized by genital ulcers and congenital syphilis in the March-April 1998 issue; to human immunodeficiency virus (HIV) infection and human papillomavirus (HPV) infection in the July-August 1998 issue; and to diseases characterized by vaginal discharge, pelvic inflammatory disease (PID), epididymitis, cervical cancer screening, proctitis, proctocolitis and enteritis, and ectoparasitic infections in the September-October 1998 issue.

A full copy of the guidelines and reference list in pdf format can be found on CDC's Division of STD Prevention Home Page at **http://www.cdc.gov/nchstp/dstd/dstdp.htm.**

Additional information for medical providers on STDs and STD training courses is available on the Internet at the following sites:

CDC's Division of STD Prevention:
http://www.cdc.gov/nchstp/dstd/dstdp.html

JAMA HIV/AIDS Information Center. HIV/AIDS Drug Information
http://www.ama-assn.org/special/hiv/treatmnt/druginfo/druginfo.htm

CDC's Division of HIV/AIDS Prevention:
http://www.cdc.gov/nchstp/hiv_aids/dhap.htm

CDC's Division of AIDS, STD, and TB Laboratory Research:
http://www.cdc.gov/ncidod/dastlr/dastlr.html

National Network of STD/HIV Prevention Training Centers:
http://129.137.232.101/STDPTC.html

St. Louis STD/HIV Prevention Training Center:
http://www.umsl.edu/services/itc/std_ptc.html
Ph: (314) 747-0294 or 747-1522

Medline - National Library of Medicine:
http://igm.nlm.nih.gov/

If you have questions regarding these guidelines, please contact DOH's Section of STD/HIV/AIDS Prevention and Care Services at (573) 751-6439.

Clinical Prevention Guidelines

The prevention and control of STDs is based on five major concepts: first, education of those at risk on ways to reduce the risk for STDs; second, detection of asymptomatically infected persons and of symptomatic persons unlikely to seek diagnostic and treatment services; third, effective diagnosis and treatment of infected persons; fourth, evaluation, treatment, and counseling of sex partners of persons who are infected with an STD; and fifth, preexposure vaccination of persons at risk for vaccine-preventable STDs. Although this report focuses primarily on the clinical aspects of STD control, prevention of STDs is based on changing the sexual behaviors that place persons at risk for infection. Moreover, because STD control activities reduce the likelihood of transmission to sex partners, prevention for individuals constitutes prevention for the community.

Clinicians have the opportunity to provide client education and counseling and to participate in identifying and treating infected sex partners in addition to interrupting transmission by treating persons who have the curable bacterial and parasitic STDs. The ability of the health-care provider to obtain an accurate sexual history is crucial in prevention and control efforts. Guidance in obtaining a sexual history is available in the chapter "Sexuality and Reproductive Health" in *Contraceptive Technology*, 16th edition (4). The accurate diagnosis and timely reporting of STDs by the clinician is the basis for effective public health surveillance.

PREVENTION MESSAGES

Preventing the spread of STDs requires that persons at risk for transmitting or acquiring infections change their behaviors. The essential first step is for the health-care provider to proactively include questions regarding the patient's sexual history as part of the clinical interview. When risk factors have been identified, the provider has an opportunity to deliver prevention messages. Counseling skills (i.e., respect, compassion, and a nonjudgmental attitude) are essential to the effective delivery of prevention messages. Techniques that can be effective in facilitating a rapport with the patient include using open-ended questions, using understandable language, and reassuring the patient that treatment will be provided regardless of considerations such as ability to pay, citizenship or immigration status, language spoken, or lifestyle.

Prevention messages should be tailored to the patient, with consideration given to the patient's specific risk factors for STDs. Messages should include a description of specific actions that the patient can take to avoid acquiring or transmitting STDs (e.g., abstinence from sexual activity if STD-related symptoms develop).

Sexual Transmission

The most effective way to prevent sexual transmission of HIV infection and other STDs is to avoid sexual intercourse with an infected partner. Counseling that provides information concerning abstinence from penetrative sexual intercourse is crucial for a) persons who are being treated for an STD or whose partners are undergoing treatment and b) persons who wish to avoid the possible consequences of sexual intercourse (e.g., STD/HIV and pregnancy). A more comprehensive discussion of abstinence is available in *Contraceptive Technology*, 16th edition (4).

- Both partners should get tested for STDs, including HIV, before initiating sexual intercourse.
- If a person chooses to have sexual intercourse with a partner whose infection status is unknown or who is infected with HIV or another STD, a new condom should be used for each act of intercourse.

Injecting-Drug Users

The following prevention messages are appropriate for injecting-drug users:

- Enroll or continue in a drug-treatment program.
- Do not, under any circumstances, use injection equipment (e.g., needles and syringes) that has been used by another person.
- If needles can be obtained legally in the community, obtain clean needles.
- Persons who continue to use injection equipment that has been used by other persons should first clean the equipment with bleach and water. (Disinfecting with bleach does not sterilize the equipment and does not guarantee that HIV is inactivated. However, for injecting-drug users, thoroughly and consistently cleaning injection equipment with bleach should reduce the rate of HIV transmission when equipment is shared.)

Preexposure Vaccination

Preexposure vaccination is one of the most effective methods used to prevent transmission of certain STDs. HBV infection frequently is sexually transmitted, and hepatitis B vaccination is recommended for all unvaccinated patients being evaluated for an STD. In the United States, hepatitis A vaccines from two manufacturers were licensed recently. Hepatitis A vaccination is recommended for several groups of patients who might seek treatment in STD clinics; such patients include homosexual or bisexual men and persons who use illegal drugs. Vaccine trials for other STDs are being conducted, and vaccines for these STDs may become available within the next several years.

PREVENTION METHODS

Male Condoms

When used consistently and correctly, condoms are effective in preventing many STDs, including HIV infection. Multiple cohort studies, including those of serodiscordant sex partners, have demonstrated a strong protective effect of condom use against HIV infection. Because condoms do not cover all exposed areas, they may be more effective in preventing infections transmitted between mucosal surfaces than those transmitted by skin-to-skin contact. Condoms are regulated as medical devices and are subject to random sampling and testing by the Food and Drug Administration (FDA). Each latex condom manufactured in the United States is tested electronically for holes before packaging. Rates of condom breakage during sexual intercourse and withdrawal are low in the United States (i.e., usually two broken condoms per 100 condoms used). Condom failure usually results from inconsistent or incorrect use rather than condom breakage.

Patients should be advised that condoms must be used consistently and correctly to be highly effective in preventing STDs. Patients also should be instructed in the correct use of condoms. The following recommendations ensure the proper use of male condoms:

- Use a new condom with each act of sexual intercourse.
- Carefully handle the condom to avoid damaging it with fingernails, teeth, or other sharp objects.
- Put the condom on after the penis is erect and before genital contact with the partner.
- Ensure that no air is trapped in the tip of the condom.
- Ensure that adequate lubrication exists during intercourse, possibly requiring the use of exogenous lubricants.
- Use only water-based lubricants (e.g., K-Y Jelly™, Astroglide™, AquaLube™, and glycerin) with latex condoms. Oil-based lubricants (e.g., petroleum jelly, shortening, mineral oil, massage oils, body lotions, and cooking oil) can weaken latex.
- Hold the condom firmly against the base of the penis during withdrawal, and withdraw while the penis is still erect to prevent slippage.

Female Condoms

Laboratory studies indicate that the female condom (Reality™)—a lubricated polyurethane sheath with a ring on each end that is inserted into the vagina—is an effective mechanical barrier to viruses, including HIV. Other than one investigation of recurrent trichomoniasis, no clinical studies have been completed to evaluate the efficacy of female condoms in providing protection from STDs, including HIV. If used consistently and correctly, the female condom should substantially reduce the risk for STDs. When a male condom cannot be used appropriately, sex partners should consider using a female condom.

Condoms and Spermicides

Whether condoms lubricated with spermicides are more effective than other lubricated condoms in protecting against the transmission of HIV and other STDs has not been determined. Furthermore, spermicide-coated condoms have been associated with *Escherichia coli* urinary tract infection in young women. Whether condoms used with vaginal application of spermicide are more effective than condoms used without vaginal spermicides also has not been determined. Therefore, the consistent use of condoms, with or without spermicidal lubricant or vaginal application of spermicide, is recommended.

Vaginal Spermicides, Sponges, and Diaphragms

As demonstrated in several randomized controlled trials, vaginal spermicides used alone without condoms reduce the risk for cervical gonorrhea and chlamydia. However, vaginal spermicides offer no protection against HIV infection, and spermicides are not recommended for HIV prevention. The vaginal contraceptive sponge, which is not available in the United States, protects against cervical gonorrhea and chlamydia, but its use increases the risk for candidiasis. In case-control and cross-sectional studies, diaphragm use has been demonstrated to protect against cervical gonorrhea, chlamydia, and trichomoniasis; however, no cohort studies have been conducted. Vaginal sponges or diaphragms should not be assumed to protect women against HIV infection. The role of spermicides, sponges, and diaphragms for preventing STDs in men has not been evaluated.

Nonbarrier Contraception, Surgical Sterilization, and Hysterectomy

Women who are not at risk for pregnancy might incorrectly perceive themselves to be at no risk for STDs, including HIV infection. Nonbarrier contraceptive methods offer no protection against HIV or other STDs. Hormonal contraception (e.g., oral contraceptives, Norplant™, and Depo-Provera™) has been associated in some cohort studies with cervical STDs and increased acquisition of HIV; however, data concerning this latter finding are inconsistent. Women who use hormonal contraception, have been surgically sterilized, or have had hysterectomies should be counseled regarding the use of condoms and the risk for STDs, including HIV infection.

HIV PREVENTION COUNSELING

Knowledge of HIV status and appropriate counseling are important components in initiating behavior change. Therefore, HIV counseling is an important HIV prevention strategy, although its efficacy in reducing risk behaviors is still being evaluated. By ensuring that counseling is empathic and client-centered, clinicians can develop a realistic appraisal of the patient's risk and help the patient develop a specific and realistic HIV prevention plan (5).

Counseling associated with HIV testing has two main components: pretest and posttest counseling. During pretest counseling, the clinician should conduct a personalized risk assessment, explain the meaning of positive and negative test results, ask for informed consent for the HIV test, and help the patient develop a realistic, personalized risk-reduction plan. During posttest counseling, the clinician should inform the patient of the results, review the meaning of the results, and reinforce prevention messages. If the patient has a confirmed positive HIV test result, posttest counseling should include referral for follow-up medical services and, if needed, social and psychological services. HIV-negative patients at continuing risk for HIV infection also may benefit from referral for additional counseling and prevention services.

PARTNER NOTIFICATION

For most STDs, partners of patients should be examined. When exposure to a treatable STD is considered likely, appropriate antimicrobials should be administered even though no clinical signs of infection are evident and laboratory test results are not yet available. In many states [including Missouri], the local or state health department can assist in notifying the partners of patients who have selected STDs (e.g., HIV infection, syphilis, gonorrhea, hepatitis B, and chlamydia).

Health-care providers should advise patients who have an STD to notify sex partners, including those without symptoms, of their exposure and encourage these partners to seek clinical evaluation. This type of partner notification is known as patient referral. In situations in which patient referral may not be effective or possible, health departments should be prepared to assist the patient either through contract referral or provider referral. Contract referral is the process by which patients agree to self-refer their partners within a defined time period. If the partners do not obtain medical evaluation and treatment within that period, then provider referral is implemented. Provider referral is the process by which partners named by infected patients are notified and counseled by health department staff.

Interrupting the transmission of infection is crucial to STD control. For treatable and vaccine-preventable STDs, further transmission and reinfection can be prevented by referral of sex partners for diagnosis, treatment, vaccination (if applicable), and counseling. When health-care providers refer infected patients to local or state health departments for provider-referral partner notification, the patients may be interviewed by trained professionals to obtain the names of their sex partners and information regarding the location of these partners for notification purposes. Every health

department protects the privacy of patients in partner-notification activities. Because of the advantage of confidentiality, many patients prefer that public health officials notify partners. However, the ability of public health officials to provide appropriate prophylaxis to contacts of all patients who have STDs may be limited. In situations where the number of anonymous partners is substantial (e.g., situations among persons who exchange sex for drugs), targeted screening of persons at risk may be more effective at stopping the transmission of disease than provider-referral partner notification. Guidelines for management of sex partners and recommendations for partner notification for specific STDs are included for each STD addressed in this report.

REPORTING AND CONFIDENTIALITY

The accurate identification and timely reporting of STDs are integral components of successful disease control efforts. Timely reporting is important for assessing morbidity trends, targeting limited resources, and assisting local health authorities in identifying sex partners who may be infected. STD/HIV and acquired immunodeficiency syndrome (AIDS) cases should be reported in accordance with local statutory requirements.

Syphilis, gonorrhea, and AIDS are reportable diseases in every state. Chlamydial infection is reportable in most states [including Missouri]. The requirements for reporting other STDs differ by state, and clinicians should be familiar with local STD reporting requirements. Reporting may be provider- and/or laboratory-based [both are required in Missouri]. Clinicians who are unsure of local reporting requirements should seek advice from local health departments or state STD programs [in Missouri, call the Section of STD/HIV/AIDS Prevention and Care Services at (573) 751-6141].

STD and HIV reports are maintained in strictest confidence; in most jurisdictions, such reports are protected by statute from subpoena. Before public health representatives conduct follow-up of a positive STD-test result, these persons should consult the patient's health-care provider to verify the diagnosis and treatment.

Special Populations

PREGNANT WOMEN

Intrauterine or perinatally transmitted STDs can have fatal or severely debilitating effects on a fetus. Pregnant women and their sex partners should be questioned about STDs and should be counseled about the possibility of perinatal infections.

Recommended Screening Tests

- A serologic test for syphilis should be performed on all pregnant women at the first prenatal visit. In populations in which utilization of prenatal care is not optimal, rapid plasma reagin (RPR)-card test screening and treatment, if that test is reactive, should be performed at the time a pregnancy is diagnosed. For patients at high risk, screening should be repeated in the third trimester and again at delivery. Some states also mandate screening all women at delivery. No infant should be discharged from the hospital without the syphilis serologic status of its mother having been determined at least one time during pregnancy and, preferably, again at delivery. Any woman who delivers a stillborn infant should be tested for syphilis.
- A serologic test for hepatitis B surface antigen (HBsAg) should be performed for all pregnant women at the first prenatal visit. HBsAg testing should be repeated late in the pregnancy for women who are HBsAg negative but who are at high risk for HBV infection (e.g., injecting-drug users and women who have concomitant STDs).
- A test for *Neisseria gonorrhoeae* should be performed at the first prenatal visit for women at risk or for women living in an area in which the prevalence of *N. gonorrhoeae* is high. A repeat test should be performed during the third trimester for those at continued risk.
- A test for *Chlamydia trachomatis* should be performed in the third trimester for women at increased risk (i.e., women aged <25 years and women who have a new or more than one sex partner or whose partner has other partners) to prevent maternal postnatal complications and chlamydial infection in the infant. Screening during the first trimester might enable prevention of adverse effects of chlamydia during pregnancy. However, evidence for adverse effects during pregnancy is minimal. If screening is performed only during the first trimester, a longer period exists for acquiring infection before delivery.

- A test for HIV infection should be offered to all pregnant women at the first prenatal visit.
- A test for bacterial vaginosis (BV) may be conducted early in the second trimester for asymptomatic patients who are at high risk for preterm labor (e.g., those who have a history of a previous preterm delivery). Current evidence does not support universal testing for BV.
- A Papanicolaou (Pap) smear should be obtained at the first prenatal visit if none has been documented during the preceding year.

Other Concerns

Other STD-related concerns are to be considered as follows:

- Pregnant women who have either primary genital herpes infection, HBV, primary cytomegalovirus (CMV) infection, or Group B streptococcal infection and women who have syphilis and who are allergic to penicillin may need to be referred to an expert for management.
- HBsAg-positive pregnant women should be reported to the local and/or state health department to ensure that they are entered into a case-management system and appropriate prophylaxis is provided for their infants. In addition, household and sexual contacts of HBsAg-positive women should be vaccinated.
- In the absence of lesions during the third trimester, routine serial cultures for herpes simplex virus (HSV) are not indicated for women who have a history of recurrent genital herpes. However, obtaining cultures from such women at the time of delivery may be useful in guiding neonatal management. Prophylactic cesarean section is not indicated for women who do not have active genital lesions at the time of delivery.
- The presence of genital warts is not an indication for cesarean section.

For a more detailed discussion of these guidelines, as well as for infections not transmitted sexually, refer to *Guidelines for Perinatal Care* (6).

NOTE: The sources for these guidelines for screening of pregnant women include the *Guide to Clinical Preventive Services* (7), *Guidelines for Perinatal Care* (6), *American College of Obstetricians and Gynecologists (ACOG) Technical Bulletin: Gonorrhea and Chlamydial Infections* (8), "Recommendations for the Prevention and Management of *Chlamydia trachomatis* Infections" (9), and "Hepatitis B Virus: A Comprehensive Strategy for Eliminating Transmission in the United States through Universal Childhood Vaccination—Recommendations of the Immunization Practices Advisory Committee (ACIP)" (1). These sources are not entirely compatible in their recommendations. The *Guide to Clinical Preventive Services* recommends screening of patients at high risk for chlamydia, but indicates that the optimal timing for screening is uncertain. The *Guidelines for Perinatal Care* recommend that pregnant women at high risk for chlamydia be screened for the infection during the first prenatal-care visit and during the third trimester. Recommendations to screen pregnant women for STDs are based on disease severity and sequelae, prevalence in the population, costs, medicolegal considerations (e.g., state laws), and other factors. The screening recommendations in this report are more extensive (i.e., if followed, more women will be screened for more STDs than would be screened by following other recommendations) and are compatible with other CDC guidelines. Physicians should select a screening strategy that is compatible with the population and setting of their medical practices and that meets their goals for STD case detection and treatment.

ADOLESCENTS

Health-care providers who provide care for adolescents should be aware of several issues that relate specifically to these persons. The rates of many STDs are highest among adolescents (e.g., the rate of gonorrhea is highest among females aged 15–19 years). Clinic-based studies have demonstrated that the prevalence of chlamydial infections, and possibly of human papillomavirus (HPV) infections, also is highest among adolescents. In addition, surveillance data indicate that 9% of adolescents who have acute HBV infection either a) have had sexual contact with a chronically infected person or with multiple sex partners or b) gave their sexual preference as homosexual. As part of a comprehensive strategy to eliminate HBV transmission in the United States, ACIP has recommended that all children be administered hepatitis B vaccine.

Adolescents who are at high risk for STDs include male homosexuals, sexually active heterosexuals, clients in STD clinics, and injecting-drug users. Younger adolescents (i.e., persons aged <15 years) who are sexually active are at particular risk for infection. Adolescents are at greatest risk for STDs because they frequently have unprotected intercourse, are biologically more susceptible to infection, and face multiple obstacles to utilization of health care.

Several of these issues can be addressed by clinicians who provide services to adolescents. Clinicians can address the general lack of knowledge and awareness about the risks and consequences of STDs and offer guidance, constituting true primary prevention, to help adolescents develop healthy sexual behaviors and prevent the establishment of patterns of behavior that can undermine sexual health. With limited exceptions, all adolescents in

the United States can consent to the confidential diagnosis and treatment of STDs. Medical care for STDs can be provided to adolescents without parental consent or knowledge. Furthermore, in many states adolescents can consent to HIV counseling and testing. Consent laws for vaccination of adolescents differ by state. Several states consider provision of vaccine similar to treatment of STDs and provide vaccination services without parental consent. Providers should appreciate how important confidentiality is to adolescents and should strive to follow policies that comply with state laws to ensure the confidentiality of STD-related services provided to adolescents.

The style and content of counseling and health education should be adapted for adolescents. Discussions should be appropriate for the patient's developmental level and should identify risky behaviors, such as sex and drug-use behaviors. Careful counseling and thorough discussions are especially important for adolescents who may not acknowledge engaging in high-risk behaviors. Care and counseling should be direct and nonjudgmental.

CHILDREN

Management of children who have STDs requires close cooperation between the clinician, laboratorians, and child-protection authorities. Investigations, when indicated, should be initiated promptly. Some diseases (e.g., gonorrhea, syphilis, and chlamydia), if acquired after the neonatal period, are almost 100% indicative of sexual contact. For other diseases, such as HPV infection and vaginitis, the association with sexual contact is not as clear (see Sexual Assault and STDs) [also, see "Reporting Child Abuse and Neglect in Missouri," which begins on page 25].

Management of Patients Who Have a History of Penicillin Allergy

No proven alternatives to penicillin are available for treating neurosyphilis, congenital syphilis, or syphilis in pregnant women. Penicillin also is recommended for use, whenever possible, in HIV-infected patients. Of the adult U.S. population, 3%–10% have experienced urticaria, angioedema, or anaphylaxis (i.e., upper airway obstruction, bronchospasm, or hypotension) after penicillin therapy. Readministration of penicillin to these patients can cause severe, immediate reactions. Because anaphylactic reactions to penicillin can be fatal, every effort should be made to avoid administering penicillin to penicillin-allergic patients, unless the anaphylactic sensitivity has been removed by acute desensitization.

An estimated 10% of persons who report a history of severe allergic reactions to penicillin are still allergic. With the passage of time after an allergic reaction to penicillin, most persons who have had a severe reaction stop expressing penicillin-specific IgE. These persons can be treated safely with penicillin. The results of many investigations indicate that skin testing with the major and minor determinants can reliably identify persons at high risk for penicillin reactions. Although these reagents are easily generated and have been available in academic centers for >30 years, only benzylpenicilloyl poly-L-lysine (Pre-Pen, the major determinant) and penicillin G are available commercially. Experts estimate that testing with only the major determinant and penicillin G identifies 90%–97% of the currently allergic patients. However, because skin testing without the minor determinants would still miss 3%–10% of allergic patients, and serious or fatal reactions can occur among these minor-determinant–positive patients, experts suggest caution when the full battery of skin-test reagents is not available. See Table 1 on the next page.

RECOMMENDATIONS

If the full battery of skin-test reagents is available, including the major and minor determinants (see Penicillin Allergy Skin Testing), patients who report a history of penicillin reaction and are skin-test negative can receive conventional penicillin therapy. Skin-test–positive patients should be desensitized.

If the full battery of skin-test reagents, including the minor determinants, is not available, the patient should be skin tested using benzylpenicilloyl poly-L-lysine (i.e., the major determinant, Pre-Pen) and penicillin G. Patients who have positive test results should be desensitized. Some experts believe that persons who have negative test results should be regarded as probably allergic and should be desensitized. Others suggest that those with negative skin-test results

can be test-dosed gradually with oral penicillin in a monitored setting in which treatment for anaphylactic reaction is possible.

TABLE 1. Oral desensitization protocol for patients with a positive skin test*

Penicillin V suspension dose†	Amount§ (units/mL)	mL	Units	Cumulative dose (units)
1	1,000	0.1	100	100
2	1,000	0.2	200	300
3	1,000	0.4	400	700
4	1,000	0.8	800	1,500
5	1,000	1.6	1,600	3,100
6	1,000	3.2	3,200	6,300
7	1,000	6.4	6,400	12,700
8	10,000	1.2	12,000	24,700
9	10,000	2.4	24,000	48,700
10	10,000	4.8	48,000	96,700
11	80,000	1.0	80,000	176,700
12	80,000	2.0	160,000	336,700
13	80,000	4.0	320,000	656,700
14	80,000	8.0	640,000	1,296,700

Observation period: 30 minutes before parenteral administration of penicillin.

*Reprinted with permission from the *New England Journal of Medicine* (24).
†Interval between doses, 15 minutes; elapsed time, 3 hours and 45 minutes; cumulative dose, 1.3 million units.
§The specific amount of drug was diluted in approximately 30 mL of water and then administered orally.

PENICILLIN ALLERGY SKIN TESTING

Patients at high risk for anaphylaxis (i.e., those who have a history of penicillin-related anaphylaxis, asthma, or other diseases that would make anaphylaxis more dangerous or who are being treated with beta-adrenergic blocking agents) should be tested with 100-fold dilutions of the full-strength skin-test reagents before being tested with full-strength reagents. In these situations, patients should be tested in a monitored setting in which treatment for an anaphylactic reaction is available. If possible, the patient should not have taken antihistamines recently (e.g., chlorpheniramine maleate or terfenadine during the preceding 24 hours, diphenhydramine HCl or hydroxyzine during the preceding 4 days, or astemizole during the preceding 3 weeks).

Reagents (Adapted from Beall [25])*

Major Determinant

- Benzylpenicilloyl poly-L-lysine (Pre-Pen [Taylor Pharmacal Company, Decatur, Illinois]) ($6x10^{-5}$M).

Minor Determinant Precursors†

- Benzylpenicillin G (10^{-2}M, 3.3 mg/mL, 6000 units/mL),
- Benzylpenicilloate (10^{-2}M, 3.3 mg/mL),
- Benzylpenilloate (or penicilloyl propylamine) (10^{-2}M, 3.3 mg/mL).

Positive Control

- Commercial histamine for epicutaneous skin testing (1 mg/mL).

* Reprinted with permission from G.N. Beall in *Annals of Internal Medicine* (25).
† Aged penicillin is not an adequate source of minor determinants. Penicillin G should be freshly prepared or should come from a fresh-frozen source.

Negative Control

- Diluent used to dissolve other reagents, usually phenol saline.

Procedures

Dilute the antigens a) 100-fold for preliminary testing if the patient has had a life-threatening reaction to penicillin or b) 10-fold if the patient has had another type of immediate, generalized reaction to penicillin within the preceding year.

Epicutaneous (prick) tests. Duplicate drops of skin-test reagent are placed on the volar surface of the forearm. The underlying epidermis is pierced with a 26-gauge needle without drawing blood.

An epicutaneous test is positive if the average wheal diameter after 15 minutes is 4 mm larger than that of negative controls; otherwise, the test is negative. The histamine controls should be positive to ensure that results are not falsely negative because of the effect of antihistaminic drugs.

Intradermal tests. If epicutaneous tests are negative, duplicate 0.02 mL intradermal injections of negative control and antigen solutions are made into the volar surface of the forearm using a 26- or 27-gauge needle on a syringe. The crossed diameters of the wheals induced by the injections should be recorded.

An intradermal test is positive if the average wheal diameter 15 minutes after injection is ≥2 mm larger than the initial wheal size and also is ≥2 mm larger than the negative controls. Otherwise, the tests are negative.

DESENSITIZATION

Patients who have a positive skin test to one of the penicillin determinants can be desensitized. This is a straightforward, relatively safe procedure that can be done orally or IV. Although the two approaches have not been compared, oral desensitization is regarded as safer to use and easier to perform. Patients should be desensitized in a hospital setting because serious IgE-mediated allergic reactions, although unlikely, can occur. Desensitization usually can be completed in approximately 4 hours, after which the first dose of penicillin is given (Table 1). STD programs should have a referral center where patients who have positive skin test results can be desensitized. After desensitization, patients must be maintained on penicillin continuously for the duration of the course of therapy.

Vaccine-Preventable STDs

One of the most effective means of preventing the transmission of STDs is preexposure immunization. Currently licensed vaccines for the prevention of STDs include those for hepatitis A and hepatitis B. Clinical development and trials are underway for vaccines against a number of other STDs, including HIV and HSV. As more vaccines become available, immunization possibly will become one of the most widespread methods used to prevent STDs.

Five different viruses (i.e., hepatitis A–E) account for almost all cases of viral hepatitis in humans. Serologic testing is necessary to confirm the diagnosis. For example, a health-care provider might assume that an injecting-drug user with jaundice has hepatitis B when, in fact, outbreaks of hepatitis A among injecting-drug users often occur. The correct diagnosis is essential for the delivery of appropriate preventive services. To ensure accurate reporting of viral hepatitis and appropriate prophylaxis of household contacts and sex partners, all case reports of viral hepatitis should be investigated and the etiology established through serologic testing.

HEPATITIS A

Hepatitis A is caused by infection with the hepatitis A virus (HAV). HAV replicates in the liver and is shed in the feces. Virus in the stool is found in the highest concentrations from 2 weeks before to 1 week after the onset of clinical illness. Virus also is present in serum and saliva during this period, although in much lower concentrations than in feces. The most common mode of HAV transmission is fecal-oral, either by person-to-person transmission between household contacts or sex partners or by contaminated food or water. Because viremia occurs in acute infection, bloodborne HAV

transmission can occur; however, such cases have been reported infrequently. Although HAV is present in low concentrations in the saliva of infected persons, no evidence indicates that saliva is involved in transmission.

Of patients who have acute hepatitis A, ≤20% require hospitalization; fulminant liver failure develops in 0.1% of patients. The overall mortality rate for acute hepatitis A is 0.3%, but it is higher (1.8%) for adults aged >49 years. HAV infection is not associated with chronic liver disease.

In the United States during 1995, 31,582 cases of hepatitis A were reported. The most frequently reported source of infection was household or sexual contact with a person who had hepatitis A, followed by attendance or employment at a day care center; recent international travel; homosexual activity; injecting-drug use; and a suspected food or waterborne outbreak. Many persons who have hepatitis A do not identify risk factors; their source of infection may be other infected persons who are asymptomatic. The prevalence of previous HAV infection among the U.S. population is 33% (CDC, unpublished data).

Outbreaks of hepatitis A among homosexual men have been reported in urban areas, both in the United States and in foreign countries. In one investigation, the prevalence of HAV infection among homosexual men was significantly higher (30%) than that among heterosexual men (12%). In New York City, a case-control study of homosexual men who had acute hepatitis A determined that case-patients were more likely to have had more anonymous sex partners and to have engaged in group sex than were the control subjects; oral-anal intercourse (i.e., the oral role) and digital-rectal intercourse (i.e., the digital role) also were associated with illness.

Treatment

Because HAV infection is self-limited and does not result in chronic infection or chronic liver disease, treatment is usually supportive. Hospitalization may be necessary for patients who are dehydrated because of nausea and vomiting or who have fulminant hepatitis A. Medications that might cause liver damage or that are metabolized by the liver should be used with caution. No specific diet or activity restrictions are necessary.

Prevention

General measures for hepatitis A prevention (e.g., maintenance of good personal hygiene) have not been successful in interrupting outbreaks of hepatitis A when the mode of transmission is from person to person, including sexual contact. To help control hepatitis A outbreaks among homosexual and bisexual men, health education messages should stress the modes of HAV transmission and the measures that can be taken to reduce the risk for transmission of any STD, including enterically transmitted agents such as HAV. However, vaccination is the most effective means of preventing HAV infection.

Two types of products are available for the prevention of hepatitis A: immune globulin (IG) and hepatitis A vaccine. IG is a solution of antibodies prepared from human plasma that is made with a serial ethanol precipitation procedure that inactivates HBV and HIV. When administered intramuscularly before exposure to HAV, or within 2 weeks after exposure, IG is >85% effective in preventing hepatitis A. IG administration is recommended for a variety of exposure situations (e.g., for persons who have sexual or household contact with patients who have hepatitis A). The duration of protection is relatively short (i.e., 3–6 months) and dose dependent.

Inactivated hepatitis A vaccines have been available in the United States since 1995. These vaccines, administered as a two-dose series, are safe, highly immunogenic, and efficacious. Immunogenicity studies indicate that 99%–100% of persons respond to one dose of hepatitis A vaccine; the second dose provides long-term protection. Efficacy studies indicate that inactivated hepatitis A vaccines are 94%–100% effective in preventing HAV infection (2).

Preexposure Prophylaxis

Vaccination with hepatitis A vaccine for preexposure protection against HAV infection is indicated for persons who have the following risk factors and who are likely to seek treatment in settings where STDs are being treated.

- **Men who have sex with men.** Sexually active men who have sex with men (both adolescents and adults) should be vaccinated.
- **Illegal drug users.** Vaccination is recommended for users of illegal injecting and noninjecting drugs if local epidemiologic evidence indicates previous or current outbreaks among persons with such risk behaviors.

Postexposure Prophylaxis

Persons who were exposed recently to HAV (i.e., household or sexual contact with a person who has hepatitis A) and who had not been vaccinated before the exposure should be administered a single IM dose of IG (0.02 mL/kg) as soon as possible, but not >2 weeks after exposure. Persons who received at least one dose of hepatitis A vaccine ≥1 month before exposure to HAV do not need IG.

HEPATITIS B

Hepatitis B is a common STD. During the past 10 years, sexual transmission accounted for approximately 30%–60% of the estimated 240,000 new HBV infections that occurred annually in the United States. Chronic HBV infection develops in 1%– 6% of persons infected as adults. These persons are capable of transmitting HBV to others, and they are at risk for chronic liver disease. In the United States, HBV infection leads to an estimated 6,000 deaths annually; these deaths result from cirrhosis of the liver and primary hepatocellular carcinoma.

The risk for perinatal HBV infection among infants born to HBV-infected mothers is 10%–85%, depending on the mother's hepatitis B e antigen (HbeAg) status. Chronic HBV infection develops in approximately 90% of infected newborns; these children are at high risk for chronic liver disease. Even when not infected during the perinatal period, children of HBV-infected mothers are at high risk for acquiring chronic HBV infection by person-to-person transmission during the first 5 years of life.

Treatment

No specific treatment is available for persons who have acute HBV infection. Supportive and symptomatic care usually are the mainstays of therapy. During the past decade, numerous antiviral agents have been investigated for treatment of chronic HBV infection. Alpha-2b interferon has been 40% effective in eliminating chronic HBV infection; persons who became infected during adulthood were most likely to respond to this treatment. Antiretroviral agents (e.g., lamivudine) have been effective in eliminating HBV infection, and a number of other compounds are being evaluated. The goal of antiviral treatment is to stop HBV replication. Response to treatment can be demonstrated by normalization of liver function tests, improvement in liver histology, and seroreversion from HBeAg-positive to HBeAg-negative. Long-term follow-up of treated patients suggests that the remission of chronic hepatitis induced by alpha interferon is of long duration. Patient characteristics associated with positive response to interferon therapy include low pretherapy HBV DNA levels, high pretherapy alanine aminotransferase levels, short duration of infection, acquisition of disease in adulthood, active histology, and female sex.

Prevention

Although methods used to prevent other STDs should prevent HBV infection, hepatitis B vaccination is the most effective means of preventing infection. The epidemiology of HBV infection in the United States indicates that multiple age groups must be targeted to provide widespread immunity and effectively prevent HBV transmission and HBV-related chronic liver disease (1). Vaccination of persons who have a history of STDs is part of a comprehensive strategy to eliminate HBV transmission in the United States. This comprehensive strategy also includes prevention of perinatal HBV infection by a) routine screening of all pregnant women, b) routine vaccination of all newborns, c) vaccination of older children at high risk for HBV infection (e.g., Alaskan Natives, Pacific Islanders, and residents in households of first-generation immigrants from countries in which HBV is of high or intermediate endemicity), d) vaccination of children aged 11–12 years who have not previously received hepatitis B vaccine, and e) vaccination of adolescents and adults at high risk for infection.

Preexposure Prophylaxis

With the implementation of routine infant hepatitis B vaccination and the wide-scale implementation of vaccination programs for adolescents, vaccination of adults at high risk for HBV has become a priority in the strategy to eliminate HBV transmission in the United States. All persons attending STD clinics and persons known to be at high risk for HBV infection (e.g., persons with multiple sex partners, sex partners of persons with chronic HBV infection, and injecting-drug users) should be offered hepatitis B vaccine and advised of their risk for HBV infection (as well as their risk for HIV infection) and the means to reduce their risk (i.e., exclusivity in sexual relationships, use of condoms, and avoidance of nonsterile drug-injection equipment).

Persons who should receive hepatitis B vaccine include the following:

- Sexually active homosexual and bisexual men;
- Sexually active heterosexual men and women, including those
  a) in whom another STD was recently diagnosed,
  b) who had more than one sex partner in the preceding 6 months,
  c) who received treatment in an STD clinic, and
  d) who are prostitutes;
- Illegal drug users, including injecting drug users and users of illegal noninjecting drugs;
- Health-care workers;
- Recipients of certain blood products;
- Household and sexual contacts of persons who have chronic HBV infection;
- Adoptees from countries in which HBV infection is endemic;
- Certain international travelers;
- Clients and employees of facilities for the developmentally disabled;
- Infants and children; and
- Hemodialysis patients.

Screening for Antibody Versus Vaccination Without Screening

The prevalence of previous HBV infection among sexually active homosexual men and among injecting-drug users is high. Serologic screening for evidence of previous infection before vaccinating adult members of these groups may be cost-effective, depending on the costs of laboratory testing and vaccine. At the current cost of vaccine, prevaccination testing on adolescents is not cost-effective. For adults attending STD clinics, the prevalence of HBV infection and the vaccine cost may justify prevaccination testing. However, because prevaccination testing may lower compliance with vaccination, the first dose of vaccine should be administered at the time of testing. The additional doses of hepatitis vaccine should be administered on the basis of the prevaccination test results. The preferred serologic test for prevaccination testing is the total antibody to hepatitis B core antigen (anti-HBc), because it will detect persons who have either resolved or chronic infection. Because anti-HBc testing will not identify persons immune to HBV infection as a result of vaccination, a history of hepatitis B vaccination should be obtained, and fully vaccinated persons should not be revaccinated.

Vaccination Schedules

Hepatitis B vaccine is highly immunogenic. Protective levels of antibody are present in approximately 50% of young adults after one dose of vaccine; in 85%, after two doses; and >90%, after three doses. The third dose is required to provide long-term immunity. The most often used schedule is vaccination at 0, 1–2, and 4–6 months. The first and second doses of vaccine must be administered at least 1 month apart, and the first and third doses at least 4 months apart. If the vaccination series is interrupted after the first or second dose of vaccine, the missing dose should be administered as soon as possible. The series should not be restarted if a dose has been missed. The vaccine should be administered IM in the deltoid, not in the buttock.

Postexposure Prophylaxis

Exposure to Persons Who Have Acute Hepatitis B

Sexual Contacts

Patients who have acute HBV infection are potentially infectious to persons with whom they have sexual contact. Passive immunization with hepatitis B immune globulin (HBIG) prevents 75% of these infections. Hepatitis B vaccination alone is less effective in preventing infection than HBIG and vaccination. Sexual contacts of patients who have acute hepatitis B should receive HBIG and begin the hepatitis B vaccine series within 14 days after the most recent sexual contact. Testing of sex partners for susceptibility to HBV infection (anti-HBc) can be considered if it does not delay treatment >14 days.

Nonsexual Household Contacts

Nonsexual household contacts of patients who have acute hepatitis B are not at high risk for infection unless they are exposed to the patient's blood (e.g., by sharing a toothbrush or razor blade). However, vaccination of household contacts is encouraged, especially for children and adolescents. If the patient remains HBsAg-positive after 6 months (i.e., becomes chronically infected), all household contacts should be vaccinated.

Exposure to Persons Who Have Chronic HBV Infection

Hepatitis B vaccination without the use of HBIG is highly effective in preventing HBV infection in household and sexual contacts of persons who have chronic HBV infection, and all such contacts should be vaccinated. Postvaccination serologic testing is indicated for sex partners of persons who have chronic hepatitis B infections and for infants born to HBsAg-positive women.

Special Considerations

Pregnancy

Pregnancy is not a contraindication to hepatitis B vaccine or HBIG vaccine administration.

HIV Infection

HBV infection in HIV-infected persons is more likely to lead to chronic HBV infection. HIV infection also can impair the response to hepatitis B vaccine. Therefore, HIV-infected persons who are vaccinated should be tested for hepatitis B surface antibody 1–2 months after the third vaccine dose. Revaccination with three more doses should be considered for those who do not respond initially to vaccination. Those who do not respond to additional doses should be advised that they might remain susceptible to HBV infection.

Sexual Assualt and STDs

ADULTS AND ADOLESCENTS

The recommendations in this report are limited to the identification and treatment of sexually transmitted infections and conditions commonly identified in the management of such infections. The documentation of findings and collection of nonmicrobiologic specimens for forensic purposes and the management of potential pregnancy or physical and psychological trauma are not included. Among sexually active adults, the identification of sexually transmitted infections after an assault is usually more important for the psychological and medical management of the patient than for legal purposes, because the infection could have been acquired before the assault.

Trichomoniasis, BV, chlamydia, and gonorrhea are the most frequently diagnosed infections among women who have been sexually assaulted. Because the prevalence of these STDs is substantial among sexually active women, the presence of these infections after an assault does not necessarily signify acquisition during the assault. Chlamydial and gonococcal infections in women are of special concern because of the possibility of ascending infection. In addition, HBV infection, if transmitted to a woman during an assault, can be prevented by post-exposure administration of hepatitis B vaccine.

Evaluation for Sexually Transmitted Infections

Initial Examination

An initial examination should include the following procedures:

- Cultures for *N. gonorrhoeae* and *C. trachomatis* from specimens collected from any sites of penetration or attempted penetration.
- If chlamydial culture is not available, nonculture tests, particularly the nucleic acid amplification tests, are an acceptable substitute. Nucleic acid amplification tests offer advantages of increased sensitivity if confirmation is available. If a nonculture test is used, a positive test result should be verified with a second test based on a different

diagnostic principle. EIA and direct fluorescent antibody are not acceptable alternatives, because false-negative test results occur more often with these nonculture tests, and false-positive test results may occur.

- Wet mount and culture of a vaginal swab specimen for *T. vaginalis* infection. If vaginal discharge or malodor is evident, the wet mount also should be examined for evidence of BV and yeast infection.
- Collection of a serum sample for immediate evaluation for HIV, hepatitis B, and syphilis (see Prophylaxis, Risk for Acquiring HIV Infection and Follow-Up Examination 12 Weeks After Assault).

Follow-Up Examinations

Although it is often difficult for persons to comply with follow-up examinations weeks after an assault, such examinations are essential a) to detect new infections acquired during or after the assault; b) to complete hepatitis B immunization, if indicated; and c) to complete counseling and treatment for other STDs. For these reasons, it is recommended that assault victims be reevaluated at follow-up examinations.

Follow-Up Examination After Assault

Examination for STDs should be repeated 2 weeks after the assault. Because infectious agents acquired through assault may not have produced sufficient concentrations of organisms to result in positive test results at the initial examination, a culture (or cultures), a wet mount, and other tests should be repeated at the 2-week follow-up visit unless prophylactic treatment has already been provided.

Serologic tests for syphilis and HIV infection should be repeated 6, 12, and 24 weeks after the assault if initial test results were negative.

Prophylaxis

Many experts recommend routine preventive therapy after a sexual assault. Most patients probably benefit from prophylaxis because the follow-up of patients who have been sexually assaulted can be difficult, and they may be reassured if offered treatment or prophylaxis for possible infection. The following prophylactic regimen is suggested as preventive therapy:

- Postexposure hepatitis B vaccination (without HBIG) should adequately protect against HBV. Hepatitis B vaccine should be administered to victims of sexual assault at the time of the initial examination. Follow-up doses of vaccine should be administered 1–2 and 4–6 months after the first dose.
- An empiric antimicrobial regimen for chlamydia, gonorrhea, trichomonas, and BV should be administered.

Recommended Regimen

Ceftriaxone 125 mg IM in a single dose,

PLUS

Metronidazole 2 g orally in a single dose,

PLUS

Azithromycin 1 g orally in a single dose or **Doxycycline** 100 mg orally twice a day for 7 days.

NOTE: For patients requiring alternative treatments, see the sections in this report that specifically address those agents.

The efficacy of these regimens in preventing gonorrhea, BV, or *C. trachomatis* genitourinary infections after sexual assault has not been evaluated. The clinician might consider counseling the patient regarding the possible benefits, as well as the possibility of toxicity, associated with these treatment regimens, because of possible gastrointestinal side effects with this combination.

Other Management Considerations

At the initial examination and, if indicated, at follow-up examinations, patients should be counseled regarding the following:

- Symptoms of STDs and the need for immediate examination if symptoms occur, and
- Abstinence from sexual intercourse until STD prophylactic treatment is completed.

Risk for Acquiring HIV Infection

Although HIV-antibody seroconversion has been reported among persons whose only known risk factor was sexual assault or sexual abuse, the risk for acquiring HIV infection through sexual assault is low. The overall probability of HIV transmission from an HIV-infected person during a single act of intercourse depends on many factors. These factors may include the type of sexual intercourse (i.e., oral, vaginal, or anal); presence of oral, vaginal or anal trauma; site of exposure to ejaculate; viral load in ejaculate; and presence of an STD.

In certain circumstances, the likelihood of HIV transmission also may be affected by postexposure therapy for HIV with antiretroviral agents. Postexposure therapy with zidovudine has been associated with a reduced risk for HIV infection in a study of health-care workers who had percutaneous exposures to HIV-infected blood. On the basis of these results and the biologic plausibility of the effectiveness of antiretroviral agents in preventing infection, postexposure therapy has been recommended for health-care workers who have percutaneous exposures to HIV. However, whether these findings can be extrapolated to other HIV-exposure situations, including sexual assault, is unknown. A recommendation cannot be made, on the basis of available information, regarding the appropriateness of postexposure antiretroviral therapy after sexual exposure to HIV.

Health-care providers who consider offering postexposure therapy should take into account the likelihood of exposure to HIV, the potential benefits and risks of such therapy, and the interval between the exposure and initiation of therapy. Because timely determination of the HIV-infection status of the assailant is not possible in many sexual assaults, the health-care provider should assess the nature of the assault, any available information about HIV-risk behaviors exhibited by persons who are sexual assailants (e.g., high-risk sexual practices and injecting-drug or crack cocaine use), and the local epidemiology of HIV/AIDS. If antiretroviral postexposure prophylaxis is offered, the following information should be discussed with the patient: a) the unknown efficacy and known toxicities of antiretrovirals, b) the critical need for frequent dosing of medications, c) the close follow-up that is necessary, d) the importance of strict compliance with the recommended therapy, and e) the necessity of immediate initiation of treatment for maximal likelihood of effectiveness. If the patient decides to take postexposure therapy, clinical management of the patient should be implemented according to the guidelines for occupational mucous membrane exposure.

SEXUAL ASSAULT OR ABUSE OF CHILDREN

Recommendations in this report are limited to the identification and treatment of STDs. Management of the psychosocial aspects of the sexual assault or abuse of children is important but is not included in these recommendations.

The identification of sexually transmissible agents in children beyond the neonatal period suggests sexual abuse. However, there are exceptions; for example, rectal or genital infection with *C. trachomatis* among young children may be the result of perinatally acquired infection and may persist for as long as 3 years. In addition, genital warts, BV, and genital mycoplasmas have been diagnosed in children who have been abused and in those not abused. There are several modes by which HBV is transmitted to children; the most common of these is household exposure to persons who have chronic HBV infection.

The possibility of sexual abuse should be considered if no obvious risk factor for infection can be identified. When the only evidence of sexual abuse is the isolation of an organism or the detection of antibodies to a sexually transmissible agent, findings should be confirmed and the implications considered carefully. The evaluation for determining whether sexual abuse has occurred among children who have infections that can be sexually transmitted should be conducted in compliance with expert recommendations by practitioners who have experience and training in the evaluation of abused or assaulted children (29).

Evaluation for Sexually Transmitted Infections

Examinations of children for sexual assault or abuse should be conducted so as to minimize pain and trauma to the child. The decision to evaluate the child for STDs must be made on an individual basis. Situations involving a high risk for STDs and a strong indication for testing include the following:

- A suspected offender is known to have an STD or to be at high risk for STDs (e.g., has multiple sex partners or a history of STD).
- The child has symptoms or signs of an STD or of an infection that can be sexually transmitted.

- The prevalence of STDs in the community is high. Other indications recommended by experts include a) evidence of genital or oral penetration or ejaculation or b) STDs in siblings or other children or adults in the household. If a child has symptoms, signs, or evidence of an infection that might be sexually transmitted, the child should be tested for other common STDs. Obtaining the indicated specimens requires skill to avoid psychological and physical trauma to the child. The clinical manifestations of some STDs are different among children in comparison with adults. Examinations and specimen collections should be conducted by practitioners who have experience and training in the evaluation of abused or assaulted children.

A principal purpose of the examination is to obtain evidence of an infection that is likely to have been sexually transmitted. However, because of the legal and psychosocial consequences of a false-positive diagnosis, only tests with high specificities should be used. The additional cost of such tests and the time required to conduct them are justified.

The scheduling of examinations should depend on the history of assault or abuse. If the initial exposure was recent, the infectious agents acquired through the exposure may not have produced sufficient concentrations of organisms to result in positive test results. A follow-up visit approximately 2 weeks after the most recent sexual exposure should include a repeat physical examination and collection of additional specimens. To allow sufficient time for antibodies to develop, another follow-up visit approximately 12 weeks after the most recent sexual exposure may be necessary to collect sera. A single examination may be sufficient if the child was abused for an extended time period or if the last suspected episode of abuse occurred well before the child received the medical evaluation.

The following recommendation for scheduling examinations is a general guide. The exact timing and nature of follow-up contacts should be determined on an individual basis and should be considerate of the child's psychological and social needs. Compliance with follow-up appointments may be improved when law enforcement personnel or child protective services are involved.

Initial and 2-Week Follow-Up Examinations

During the initial examination and 2-week follow-up examination (if indicated), the following should be performed:

- Visual inspection of the genital, perianal, and oral areas for genital warts and ulcerative lesions.
- Cultures for *N. gonorrhoeae* specimens collected from the pharynx and anus in both boys and girls, the vagina in girls, and the urethra in boys. Cervical specimens are not recommended for prepubertal girls. For boys, a meatal specimen of urethral discharge is an adequate substitute for an intraurethral swab specimen when discharge is present. Only standard culture systems for the isolation of *N. gonorrhoeae* should be used. All presumptive isolates of *N. gonorrhoeae* should be confirmed by at least two tests that involve different principles (e.g., biochemical, enzyme substrate, or serologic methods). Isolates should be preserved in case additional or repeated testing is needed.
- Cultures for *C. trachomatis* from specimens collected from the anus in both boys and girls and from the vagina in girls. Limited information suggests that the likelihood of recovering *Chlamydia* from the urethra of prepubertal boys is too low to justify the trauma involved in obtaining an intraurethral specimen. A urethral specimen should be obtained if urethral discharge is present. Pharyngeal specimens for *C. trachomatis* also are not recommended for either sex because the yield is low, perinatally acquired infection may persist beyond infancy, and culture systems in some laboratories do not distinguish between *C. trachomatis* and *C. pneumoniae*.

  Only standard culture systems for the isolation of *C. trachomatis* should be used. The isolation of *C. trachomatis* should be confirmed by microscopic identification of inclusions by staining with fluorescein-conjugated monoclonal antibody specific for *C. trachomatis*. Isolates should be preserved. Nonculture tests for chlamydia are not sufficiently specific for use in circumstances involving possible child abuse or assault. Data are insufficient to adequately assess the utility of nucleic acid amplification tests in the evaluation of children who might have been sexually abused, but expert opinion suggests these tests may be an alternative if confirmation is available but culture systems for *C. trachomatis* are unavailable.
- Culture and wet mount of a vaginal swab specimen for *T. vaginalis* infection. The presence of clue cells in the wet mount or other signs, such as a positive whiff test, suggests BV in girls who have vaginal discharge. The significance of clue cells or other indicators of BV as an indicator of sexual exposure is unclear. The clinical significance of clue cells or other indicators of BV in the absence of vaginal discharge also is unclear.

- Collection of a serum sample to be evaluated immediately, preserved for subsequent analysis, and used as a baseline for comparison with follow-up serologic tests. Sera should be tested immediately for antibodies to sexually transmitted agents. Agents for which suitable tests are available include *T. pallidum*, HIV, and HBsAg. The choice of agents for serologic tests should be made on a case-by-case basis (see Examination 12 Weeks After Assault). HIV antibodies have been reported in children whose only known risk factor was sexual abuse. Serologic testing for HIV infection should be considered for abused children. The decision to test for HIV infection should be made on a case-by-case basis, depending on likelihood of infection among assailant(s). Data are insufficient concerning the efficacy and safety of postexposure prophylaxis among children. Vaccination for HBV should be recommended if the medical history or serologic testing suggests that it has not been received (see Hepatitis B).

Examination 12 Weeks After Assault

An examination approximately 12 weeks after the last suspected sexual exposure is recommended to allow time for antibodies to infectious agents to develop if baseline tests are negative. Serologic tests for *T. pallidum*, HIV, and HBsAg should be considered. The prevalence of these infections differs substantially by community, and serologic testing depends on whether risk factors are known to be present in the abuser or assailant. In addition, results of HBsAg testing must be interpreted carefully, because HBV also can be transmitted nonsexually. The choice of tests must be made on an individual basis.

Presumptive Treatment

The risk for a child's acquiring an STD as a result of sexual abuse has not been determined. The risk is believed to be low in most circumstances, although documentation to support this position is inadequate.

Presumptive treatment for children who have been sexually assaulted or abused is not widely recommended because girls appear to be at lower risk for ascending infection than adolescent or adult women, and regular follow-up usually can be ensured. However, some children—or their parent(s) or guardian(s)—may be concerned about the possibility of infection with an STD, even if the risk is perceived by the health-care provider to be low. Patient or parental/guardian concerns may be an appropriate indication for presumptive treatment in some settings (i.e., after all specimens relevant to the investigation have been collected).

Reporting

Every state, the District of Columbia, Puerto Rico, Guam, the U.S. Virgin Islands, and American Samoa have laws that require the reporting of child abuse. The exact requirements differ by state, but, generally, if there is reasonable cause to suspect child abuse, it must be reported. Health-care providers should contact their state or local child-protection service agency about child abuse reporting requirements in their areas. (Information about reporting child abuse and neglect in Missouri can be found on pages 25–26 of this issue.)

Medical providers play a vital role in the prevention and control of sexually transmitted diseases (STDs). Providers can help significantly reduce the occurrence of these diseases by:

- **Evaluating each patient, as appropriate, for evidence of STDs, and for evidence of high-risk sexual behaviors.**
- **Promptly diagnosing and treating patients with STDs according to current guidelines.**
- **Providing appropriate follow-up after patients have been treated.**
- **Providing education and counseling to patients engaging in high-risk sexual behaviors.**
- **Promptly reporting, as required by Missouri law, all cases of chlamydial infection, gonorrhea, syphilis, and hepatitis B to the local health department, or to the Missouri Department of Health (DOH) at (573) 751-6463.**

Reports of cases of HIV infection/AIDS should be made as follows:

- **Health care providers in St. Louis City and St. Louis County should report the individual to the St. Louis City Department of Health and Hospitals at (314) 658-1159.**
- **Providers in the five-county Kansas City metropolitan area should report to the Kansas City Health Department at (816) 983-4200.**
- **All other providers should report to DOH's Office of Surveillance at (573) 751-6463.**

The National Network of STD/HIV Prevention Training Centers presents....

Effective STD/HIV Prevention Counseling for the Busy Primary Care Provider

March 18, 1999 - 11:00 a.m.–1:00 p.m.

This live, interactive, national satellite broadcast for clinicians will include live discussion between the moderator and faculty, and clinical vignettes demonstrating effective "client-centered counseling" techniques featuring three clients: an adolescent female client, a 35 year old pregnant client, and a 40 year old homosexual male client. At the end of the program, there will be a 30-minute question and answer session. A toll free number will be available for participants to call in with questions.

COURSE OBJECTIVES

After this program, the participant should be able to:

- Identify strategies for integrating STD/HIV risk assessment/risk reduction counseling into a clinic visit.
- Ask appropriate open-ended questions that facilitate communication and patients' adoption of risk reduction behaviors.
- Define the concept of "client-centered" risk assessment/risk reduction counseling.
- Discuss key concepts of behavior change theory related to client-centered counseling and the results of relevant research.

TARGET AUDIENCE

Physicians, nurse practitioners, nurse midwives, physician assistants, registered nurses, counselors, educators and other health care providers who provide care to patients who are at risk for STD/HIV.

CONTINUING EDUCATION

The University of Cincinnati College of Medicine designates this educational activity for a maximum of 2.0 hours in Category 1 credit towards the AMA Physician's Recognition Award. Each physician should claim only those hours s/he actually spent in the educational activity.

This activity has been planned and implemented in accordance with the Essentials and Standards of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the University of Cincinnati and the National Network of STD/HIV Prevention Training Centers. The University of Cincinnati is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. These certificates are for physicians, and physician assistants as well as nurses or advanced practice nurses in state/commonwealths that accept CME credit toward continuing education unit for nurses.

The Denver STD/HIV Prevention Training Center is approved as a provider of continuing nurses education by the Colorado Nurses Association which is accredited as an approver of continuing education in nursing by the American Nurses Credentialing Center's Commission on Accreditation. Registered Nurses and Nurse Practitioners will receive 2.4 contact hours after viewing this program.

WAYS OF VIEWING CONFERENCE

Choose a prearranged site in your state and register to attend the conference. Arrive at the site by 10:30 a.m., CST, Thursday, March 18, 1999.

OR

View at your own facility via satellite. To become a site, please call (314) 747-0294 by Thursday, March 11, 1999 and we will help you make the necessary arrangements. The building or site in your area must have a satellite dish, a technician and a phone.

WAYS TO REGISTER

Upon registration, your place is reserved.

Internet: register directly on the web at **http://inpharmatics.uc.edu/stdptc.html**

Mail: Registrations are due by Thursday, March 11, 1999.

Fax: Please copy the registration form on white paper, complete the form, then fax it to (314) 362-1872.

E-mail: Send all of the information on the registration form to: dschenew@ximgate:wustl.edu

Phone: We will accept registrations over the phone between **March 9–16, 1999.** Please call (314) 747-1522. Please be aware that space at prearranged sites may be limited by this time.

Registration Form

Last Name _____ First Name _____ Profession _____

Name of Work/Organization _____

Address: _____

City: _____ State: _____ Zip: _____ Email address:_____

Work Phone: ( ) _____ Home Phone: ( ) _____ Fax Number: ( )_____

Send registration form by March 11, 1999 to: St. Louis STD/HIV Prevention Training Center, Washington University School of Medicine, 660 So. Euclid, Campus Box 8051, St. Louis, Missouri 63110.

Reporting Child Abuse and Neglect in Missouri

Information provided by
Division of Family Services
Department of Social Services.

Who must report child abuse and neglect?

In Missouri, professionals such as physicians, dentists and teachers are required by law to call the child abuse and neglect hotline if they have reasonable cause to suspect abuse or neglect. These professionals are in a unique position to identify problems that put children in danger. Reasonable cause to suspect means a standard of reasonable suspicion, rather than conclusive proof. A report may also be made to any law enforcement agency or juvenile office, although this does not take the place of making a report to the Division of Family Services, Department of Social Services.

What is child abuse and neglect?

Abuse is defined as: ".. Any physical injury, sexual abuse or emotional abuse inflicted on a child other than by accidental means by those responsible for his care, custody and control except that discipline including spanking, administered in a reasonable manner shall not be constituted to be abuse."

Neglect is defined as: ".. Failure to provide, by those responsible for the care, custody and control of the child, the proper or necessary support, education as required by law, nutrition or medical, surgical or any other care necessary for the child's well-being."

Those responsible for the care, custody and control of the child are defined as: "... include but not limited to the parents or guardian of a child, other members of the child's household, or those exercising supervision over a child for any part of a 24 hour day. Also included is any adult, who, based on their relationship to the parents of the child, members of the child's household or the family, has access to the child." (Section 210.110, RSMo)

How to report suspected child abuse and neglect

If you suspect that a child is being abused or neglected, call the Division of Family Services' toll-free hotline at (800) 392-3738. A social worker will ask you questions to determine if your information matches the criteria established by state statute as abuse or neglect. You can also call your local Division of Family Services office to discuss your concerns. The local office staff can advise you whether to call the hotline.

What information is needed?

It will be important for you to know the identity of the child, parents and the alleged perpetrator and where the child can be located. You must have specific allegations of abuse or neglect. According to state law, the alleged perpetrator must have care, custody and control of the child for a finding of abuse or neglect. In Missouri, a child is anyone under the age of 18. For other questions that you might be asked, see the sidebar on page 26.

Do reporters have to give their name?

In Missouri, reporters do not have to identify themselves. However, by giving your name, staff will be able to contact you for more information that might be needed. The names of all reporters are kept strictly confidential and will not be released to the family, child or the alleged perpetrator.

Immunity/Penalties

The law provides immunity from civil or criminal liability to those who are required to make reports, and also in cooperating with the Division of Family Services, any law enforcement agency, or the juvenile office in the completion of an investigation. Immunity is provided regardless of the outcome of the investigation, however, it does not apply if a person intentionally makes a false report.

Save a Child

Child Abuse/Neglect Hotline

(800) 392-3738
Statewide toll-free 24 hours

(314) 751-3448
Outside Missouri

Failure to report is a Class A misdemeanor for a person who is required under the law to report, Filing a false report is also a Class A misdemeanor.

What happens after the call?

If the information meets the criteria for abuse/neglect, the information is transmitted electronically or over the phone to the local office for investigation. If the child is unsafe, county staff will immediately make contact with the child to determine how the child can be made safe while the investigation is conducted. All investigations start within 24 hours after the call is received. The normal process is for staff to contact the reporter, then the family and finally the alleged perpetrator. If the report suggests a criminal violation, law enforcement will be requested to assist in the investigation. Most investigations are completed within 30 days of the initial call to the hotline.

What if the report does not constitute abuse or neglect?

Concerned citizens sometimes call about situations that do not meet the criteria for abuse and neglect or lack important information that is necessary for an investigation to be conducted. In some instances, the reporter will be asked to call back if they receive the needed information. The Division of Family Services may refer the call to the local office if the family could benefit from preventive services.

(continued on page 26)

(continued from page 25)

What if the report involves a child-care facility?

The Division of Family Services investigates reports of child abuse or neglect in schools, child care centers, residential care facilities and foster homes. When a report is received on a facility, the investigation is assigned to specially-trained professionals in the Out-of-Home Investigations Unit.

What happens after the investigation is conducted?

After conducting a comprehensive investigation, the social worker will decide if abuse or neglect occurred (probable cause) or if there is insufficient evidence to say the abuse/neglect occurred (unsubstantiated). If the investigation is unsubstantiated but the family is at risk of abuse or neglect, the social worker may recommend services. If the case is found "probable cause," the first priority for the Division of Family Services is to keep children safe.

The social worker might open a **family-centered services** case to help the family identify services that will prevent or remedy abuse or neglect. **Temporary support services** such as counseling, child care, homemaker or parenting classes may also be provided. If the child is at immediate risk of being removed, **Intensive In-Home Services** can be provided to keep the child safe in the home. The intent of the division's intervention is to reduce the risk of future abuse or neglect and connect the family to community spots.

What happens if the child cannot remain at home?

If a child is at immediate risk of serious harm and no appropriate intervention can reduce their risk, the Division of Family Services will recommend to the juvenile court that the child be removed from the home. **The Division of Family Services cannot remove the child from the home without a court order.**

Child abuse and neglect hotline unit

The hotline unit is staffed by trained and experienced social service workers. All staff have a bachelor or masters degree and attend a preservice training program, as well as ongoing in-service general and specialized training to assist them in interviewing callers, assessing information and classifying report of abuse or neglect.

The hotline unit operates the statewide toll-free telephone service 24 hours a day/365 days a year. Staff are available at all times to accept calls and to assist callers in making reports of abuse or neglect and by providing referral services when appropriate.

Annually, the hotline unit accepts and processes approximately 100,000 calls. Over half of these calls are investigated. Another 25,000 calls are referred to local agencies and the remaining calls receive telephone assistance or referral.

Reporting Child Abuse/Neglect

The following information, if available, should be provided when making a report:

- The name, address, present whereabouts, sex, race and birth date or estimated age of the reported child or children and of any other children in the household.
- The name(s), address(es) and telephone number(s) of the child's parent(s), or other person(s) responsible for the child's care.
- The name(s), address(es) and telephone number(s) of the person(s) alleged to be responsible for the abuse or neglect, if different from the parent(s).
- Directions to the home, if available, when the child's address is general delivery, rural route or only a town.
- Other means of locating the family.
- Parents/alleged perpetrators' place of employment and work hours, if known.
- The full nature and extent of the child's injuries, abuse or neglect, and any indication of prior injuries, including the reason for suspecting the child may be subjected to conditions resulting in abuse or neglect.
- Any event that precipitated the report.
- An assessment of the risk of further harm to the child and, if a risk exists, whether it is imminent.
- If the information was provided by a third party, or if there were witnesses, the identity of that person(s).
- The circumstances under which the reporter first became aware of the child's alleged injuries, abuse or neglect.

Recommended Childhood Immunization Schedule
Missouri, January - December 1999

Vaccines[1] are listed under the routinely recommended ages.

Bars indicate range of acceptable ages for immunization. Catch-up immunization should be done during any visit when feasible.

Shaded ovals indicate vaccines to be assessed and given if necessary during the early adolescent visit.

Vaccines listed below the dashed line are not given to all children routinely but are recommended in special circumstances.

Age ➢ / Vaccine ➘	Birth	1 mo	2 mos	4 mos	6 mos	12 mos	15 mos	18 mos	2 yrs	4-6 yrs	11-12 yrs	14-16 yrs
Hepatitis B[2, 3]	Hepatitis B-1		Hepatitis B-2		Hepatitis B-3						Hep B[3]	
Diphtheria, Tetanus, Pertussis[4]			DTaP	DTaP	DtaP	DTaP[4]				DTaP	Td	
H. influenzae type b[5]			Hib	Hib	Hib	Hib						
Polio[6]			IPV[6]	IPV[6]	Polio[6]					Polio		
Measles, Mumps, Rubella[7]						MMR				MMR[7]	MMR[7]	
Varicella[8]						Varicella					Var[8]	
Rotavirus[9]			Rota-virus[9]	Rota-virus[9]	Rota-virus[9]							
Hepatitis A[10]									Hepatitis A			
Influenza[11]					Influenza							
Pneumococcal[12]									Pneumococcal			

Notes

1. This schedule indicates the recommended age for routine administration of currently licensed childhood vaccines. Some combination vaccines are available and may be used whenever administration of all components of the vaccine is indicated. Providers should consult the manufacturers' package inserts for detailed recommendations.
2. **Infants born to HBsAg-negative mothers** should receive 5 µg of Merck vaccine (Recombivax HB®) or 10 µg of SmithKline Beecham (SB) vaccine (Engerix-B®). The second dose should be administered at least 1 month after the first dose. The third dose should be given at least 2 months after the second, but not before 6 months of age. Children who have begun the series with a 2.5 µg dose may complete the series with either a 2.5 µg dose or a 5 µg dose.

   Infants born to HBsAg-positive mothers should receive 0.5 mL hepatitis B immune globulin (HBIG) within 12 hours of birth, and either 5 µg of Merck vaccine (Recombivax HB®) or 10 µg of SB vaccine (Engerix-B®) at a separate site. The second dose is recommended at 1-2 months of age, and the third dose at 6 months of age.

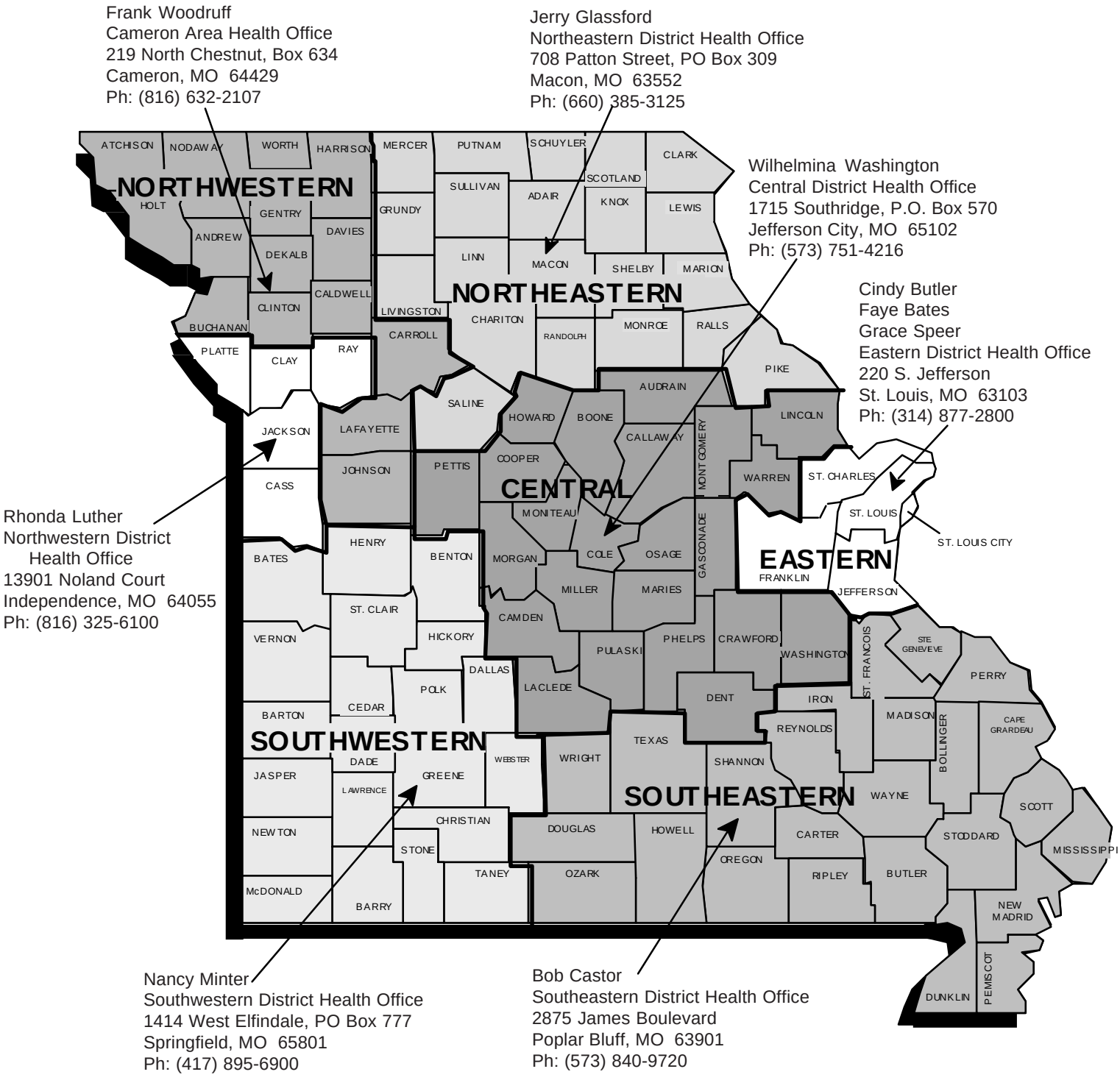
   Infants born to mothers whose HBsAg status is unknown should receive either 5 µg of Merck vaccine (Recombivax HB®) or 10 µg of SB vaccine (Engerix-B®) within 12 hours of birth. The second dose of vaccine is recommended at 1 or 2 months of age, and the third dose at 6 months of age. Blood should be drawn at the time of delivery to determine the mother's HBsAg status; if it is positive, the infant should receive HBIG as soon as possible (no later than 1 week of age). The dosage and timing of subsequent vaccine doses should be based upon the mother's HBsAg status.
3. Children and adolescents who have not been vaccinated against hepatitis B in infancy may begin the series during any visit. Those who have not previously received 3 doses of hepatitis B vaccine should initiate or complete the series during the 11-12-year-old visit, and unvaccinated older adolescents should be vaccinated whenever possible. The second dose should be administered at least 1 month after the first dose, and the third dose should be administered at least 4 months after the first dose and at least 2 months after the second dose.
4. DTaP (diphtheria and tetanus toxoids and acellular pertussis vaccine) is the preferred vaccine for all doses in the vaccination series, including completion of the series in children who have received 1 or more doses of whole-cell DTP vaccine. Whole-cell DTP is an acceptable alternative to DTaP. The fourth dose (DTP or DTaP) may be administered as early as 12 months of age, provided 6 months have elapsed since the third dose and if the child is considered unlikely to return at 15-18 months of age. Td (tetanus and diphtheria toxoids) is recommended at 11-12 years of age if at least 5 years have elapsed since the last dose of DTP, DTaP or DT. Subsequent routine Td boosters are recommended every 10 years.
5. Three H. influenzae type b (Hib) conjugate vaccines are licensed for infant use. If PRP-OMP (PedvaxHIB® [Merck]) is administered at 2 and 4 months of age, a dose at 6 months is not required.
6. Two poliovirus vaccines are currently licensed in the United States: inactivated poliovirus (IPV) vaccine and oral poliovirus (OPV) vaccine. The ACIP, AAP, and AAFP now recommend that the first 2 doses of poliovirus vaccine should be IPV. The ACIP continues to recommend a sequential schedule of 2 doses of IPV administered at ages 2 and 4 months, followed by 2 doses of OPV at 12-18 months and 4-6 years. Use of IPV for all doses also is acceptable and is recommended for immunocompromised persons and their household contacts

   OPV is no longer recommended for the first 2 doses of the schedule and is acceptable only for special circumstances such as: children of parents who do not accept the recommended number of injections, late initiation of immunization which would require an unacceptable number of injections, and imminent travel to polio-endemic areas. OPV remains the vaccine of choice for mass immunization efforts. This schedule remains due to wild poliovirus.
7. The second dose of MMR is recommended routinely at 4-6 years of age, and is required for school entry, but may be administered during any visit, provided at least one month has elapsed since receipt of the first dose and that both doses are administered at or after 12 months of age. Those who have not **previously** received the second dose should complete the schedule no later than the 11-12-year visit.
8. Susceptible children may receive varicella vaccine during any visit after the first birthday, and those who lack a reliable history of chickenpox should be vaccinated during the 11-12-year-old visit. Susceptible persons 13 years of age or older should receive 2 doses, at least one month apart.
9. **Rotavirus:** Health care providers may require time and resources to incorporate this new vaccine into practice. The AAFP feels that the decision to use rotavirus vaccine should be made by the parent or guardian in consultation with his or her physician or other health care provider. The first dose of rotavirus vaccine should not be administered before 6 weeks of age and the minimum interval between doses is 3 weeks. The rotavirus series should not be initiated at 7 months of age or older and all doses should be completed by the first birthday.
10. Give hepatitis A vaccine to children and adolescents who are at increased risk of infection, as defined by ACIP, and consider for all other persons >2 years of age wishing to obtain immunity. A booster should be given ≥6 months after the initial dose.
11. **Influenza:** Influenza vaccine should be given annually to children ≥6 months of age who have specific risk factors, as defined by ACIP. Children ≤12 years should receive split virus vaccine in a dosage appropriate for their age (0.25 mL if 6-35 months of age or 0.5 mL if ≥3 years). Children <9 years of age who are receiving influenza vaccine for the first time should receive 2 doses separated by at least one month.
12. **Pneumococcal:** Give pneumococcal vaccine to children ≥2 years of age at increased risk of acquiring systemic pneumococcal infections or increased risk of serious disease if they become infected. Give a second dose to children at highest risk of serious pneumococcal infection, as defined by ACIP. This includes those ≤10 years of age if ≥3 years from first dose and those >10 years of age if ≥5 years from first dose.

Sources: Based on recommendations of the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP).

MISSOURI DEPARTMENT OF HEALTH

District Immunization Representatives



This map shows the division of counties into Department of Health districts and gives the names of the district immunization representatives. Feel free to contact your district immunization representative with questions regarding the new immunization schedule or other immunization issues.

VIDEOCONFERENCES in 1999

The Section of Vaccine-Preventable and Tuberculosis Disease Elimination will sponsor the following Centers for Disease Control and Prevention (CDC) satellite broadcasts:

Preparing for the Next Influenza Pandemic

February 25, 1999

This program will introduce the planning guidelines to facilitate state and local emergency response preparations—preparations which can be adapted to other community crises. Attendees will have the opportunity to lay out the blueprint for community plans and determine responsibilities for specific activities in a crisis situation. Please contact the Local Public Health Agency in your area or the Section for broadcast location and time.

Epidemiology and Prevention of Vaccine-Preventable Diseases

March 25, April 1, 8 and 15, 1999 (4-day course)

This program will provide the most current information about the vaccine-preventable diseases and the vaccines which provide protection against these diseases.

Immunization Update

September 16, 1999

This program will provide the most current information available in the constantly changing field of immunization.

Surveillance of Vaccine-Preventable Diseases

December 2, 1999

This program will provide guidelines for vaccine-preventable surveillance, case investigation and outbreak control.

These live, interactive satellite videoconferences feature question and answer sessions in which participants can address questions to the course instructors on toll-free telephone lines. Continuing education credits will be offered for a variety of professions.

For more information about the courses, site locations and times, contact the immunization representative located in your district health office or the Section of Vaccine-Preventable and Tuberculosis Disease Elimination at (800) 699-2313.

Maternal Smoking Trends in Missouri

(continued from page 4)

REFERENCE:

1. NCHS-CDC. Smoking during pregnancy, 1990–1996. National Vital Statistics Report Nov. 19, 1998; 47(10).

For additional information on smoking trends in Missouri, see the following references:

- Hagdrup N, Simoes E, Brownson RC. Selected chronic disease risk factors in Missouri: 10-year trends and predictions for the year 2000. Am J Prev Med 1997;13:45–50.
- Miller N, Simoes EJ, Murayi T. Tobacco use among Missouri high school students, 1995. Missouri Med 1997;94:332–337.
- Miller N, Simoes EJ, Chang J. Smoking attributable mortality in Missouri, 1995. Missouri Med 1997;94:661–665.

Editorial Note: Missouri smoking rates have fallen—but not as much as the United States—and each year since 1990 Missouri has ranked in the top six of states with the highest maternal smoking rates. With our adult smoking rates being second and high school student rates ranking fifth highest, more efforts are needed to prevent and reduce smoking in Missouri. Massachusetts—with a strong tobacco control program—decreased maternal smoking by nearly 50%.

Dr. Marion Warwick Appointed Chief, Section of Communicable Disease and Veterinary Public Health

Marion Warwick, M.D., M.P.H., was appointed the Chief of the Missouri Department of Health's Section of Communicable Disease and Veterinary Public Health (previously the Bureau of Communicable Disease Control) in August 1998. Dr. Warwick will be responsible for the public health response to communicable and zoonotic diseases.

Dr. Warwick received her medical education from the University of Minnesota Medical School. She is board certified in preventive medicine and family practice. Her preventive medicine residency was at the University of Massachusetts and her family practice residency was at the Hennepin County Medical Center in Minneapolis, Minnesota. She also has a Masters in Public Health from the University of Massachusetts.

Dr. Warwick worked as a staff physician for the University of Minnesota before coming to Missouri. She worked for the St. Louis City Department of Public Health as a communicable disease physician, where she was in charge of surveillance of reportable diseases and disease investigations. She became medical consultant to the Missouri Department of Health Bureau of HIV/AIDS Care and Prevention Services as well as to the Division of Environmental Health and Communicable Disease Prevention in July 1997.

You may contact Dr. Warwick at the Section of Communicable Disease and Veterinary Public Health at (573) 751-6113.

Tuberculosis Awareness Fortnight

March 14–27, 1999

The Missouri Department of Health Section of Vaccine-Preventable and Tuberculosis Disease Elimination along with the American Lung Associations of Eastern and Western Missouri recognize Tuberculosis Awareness Fortnight, March 14–27, 1999 and World TB Day on March 24, 1999.

Hospitals are encouraged to conduct tuberculosis grand rounds during this time. Physicians and health care providers are encouraged to participate by providing displays, educational materials and lectures to staff and clients on the importance of tuberculosis screening, prevention and treatment.

A physician's seminar on tuberculosis is planned in St. Louis on March 25. The speaker will be Patricia Simone, M.D., Chief of the Field Services Branch, Division of Tuberculosis Elimination, Centers for Disease Control and Prevention. For more information on this seminar, call the American Lung Association of Eastern Missouri at (314) 645-5505.

Grand rounds are being planning in the Kansas City area on March 26 at St. Luke's Hospital of Kansas City at 7:45 a.m. and at University of Missouri–Kansas City School of Medicine at 12:00 noon. The speaker at both sites will be Daniel F. Hoft, M.D., Ph.D. from the Division of Infectious Diseases and Immunology at St. Louis University Health Sciences Center. For more information on the grand rounds, call the American Lung Association of Western Missouri at (816) 842-5242.

If you are interested in additional information or would like some literature on tuberculosis, please contact:

Section of Vaccine-Preventable and Tuberculosis Disease Elimination
(800) 611-2912

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
P.O. Box 570
Jefferson City, MO 65102-0570
www.health.state.mo.us

The *Missouri Epidemiologist* is a regularly scheduled bimonthly newsletter published jointly by the Office of Epidemiology, Center for Health Information Management and Epidemiology (CHIME) and the Division of Environmental Health and Communicable Disease Prevention (EHCDP). CHIME's responsibilities include managing health statistical systems, epidemiological functions and information systems of the department. EHCDP's responsibilities include the prevention and control of communicable diseases and environmentally induced illnesses, including the requisite epidemiological investigations.

The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272.

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Office of Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

LATE BREAKERS

☞ **Influenza Season Begins in Missouri**—Three cases positive for influenza A by the new rapid-antigen method have been reported in Missouri, a 19-year-old student from Columbia on October 31, a 9-year-old from Chillicothe on December 1 and a 93-year-old nursing home resident from St. Louis County on December 11. Another influenza case was reported on November 9; an adult visitor to Missouri from the state of Louisiana. On December 24, a 19-year-old student from Truman State University became Missouri's first viral culture, laboratory-confirmed case of influenza A, subtyped H3N2. The student had onset of influenza symptoms on December 7. When compared to last season, the 1998–99 influenza season is off to a very slow start. During the 1997–98 season, 98% of the confirmed cases of influenza in Missouri were type A, and the season peaked in the last week of January. If you have questions regarding influenza, contact the Section of Communicable Disease Control and Veterinary Public Health at (800) 392-0272.

☞ **Product Recall**—From early August 1998 through January 6, 1999, at least 50 illnesses, six deaths and two spontaneous abortions caused by a rare strain of the bacterium *Listeria monocytogenes*, serotype 4b, were reported to the Centers for Disease Control and Prevention by 11 states. The vehicle for transmission was identified as hot dogs, and possibly deli meats, produced under many brand names manufactured by Bil Mar Foods. Bil Mar Foods voluntarily recalled specific production lots of hot dogs and deli meats on December 22. The affected products included hot dogs and deli meats with the brand names Ball Park, Bil Mar, Bryan Bunsize, Bryan 3-lb Club Pack,Grillmaster, Hygrade, Mr. Turkey, Sara Lee Deli Meat and Sara Lee Home Roast brands. As of January 8, 1999, only one probable case of *Listeria* associated with the recall has been identified in Missouri. If you have questions regarding *Listeria* or the recall, contact your local health department or the Section of Communicable Disease Control and Veterinary Public Health at (800) 392-0272.